PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-285589
(43)Date of publication of application : 13.10.2000

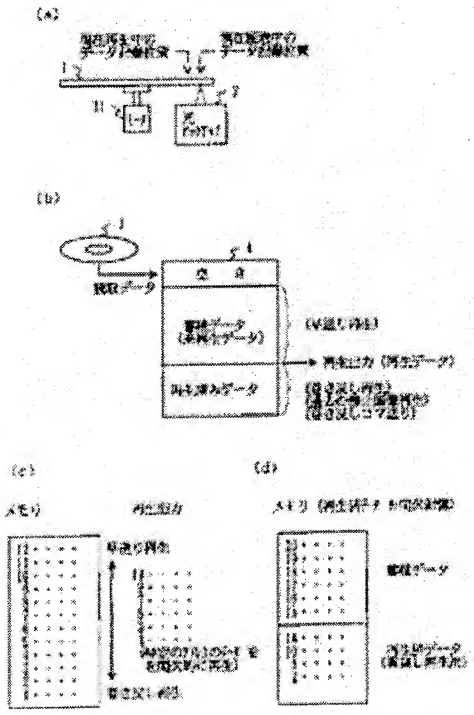
(51)Int.Cl. G11B 20/10

(21)Application number : 11-094570
(22)Date of filing : 01.04.1999

(71)Applicant : FUJITSU TEN LTD
(72)Inventor : HAMADA SHIGEKI
KATSUNO MASAYUKI
KOYAMA HIROMITSU

(54) REPRODUCTION DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a reproduction device which suppresses sound interruption and the occurrence of waiting time at the time of fast forwarding reproduction and rewinding reproduction.
SOLUTION: A reproduction device is provided with a reading means 2 reading data form a recording medium 1 where data is recorded, a storage means 4 storing data which is read by the reading means and a control means reading and reproducing data which is stored by the storage means. The control means controls the storage state of reproduced data whose reproduction is completed into the storage means and controls the reading and reproduction of reproduced data held in the storage means in response to a specified operation. When fast forwarding reproduction and rewinding reproduction are instructed, non- reproduced data and reproduced data, which are stored in the storage means, are used and reproduction is started. Data is adjusted to be read from the recording medium during that time and reading data is switched when a system becomes a read possible state.



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]A reading means which reads data in a recording medium with which data was recorded.
A memory measure which memorizes data read by this reading means.
A control means which reads data memorized by this memory measure and is reproduced.
It controls to be playback equipment provided with the above, to read reproduced data which answered specific operation and was held at said memory measure while controlling said control means to hold a memory state to said memory measure of reproduced data which reproduction completed, and to reproduce.

[Claim 2]The playback equipment according to claim 1 when rewinding reproduction is directed, wherein said control means reads intermittently reproduced data held at said memory measure to an opposite direction with the direction of ordinary reproduction and is reproduced.
[Claim 3]The playback equipment according to claim 1, wherein said memory measure thins out and holds said reproduced data.
[Claim 4]The playback equipment according to claim 1 when said control means is directed [rewinding reproduction], wherein it makes reproduction speed of said reproduced data quick.
[Claim 5]The playback equipment according to claim 1, wherein it has a directing means which directs said reproduced data storage holding state and said control means controls said reproduced data storage holding state according to an operating condition of said directing means.
[Claim 6]The playback equipment according to claim 5, wherein said control means controls said reproduced data storage holding state based on frequency where it becomes impossible for said reading means to read data in said recording medium.
[Claim 7]The playback equipment according to claim 1, wherein said control means controls said reproduced data storage holding state based on a relation with data volume of said non-regenerative data memorized by said memory measure and reproduced data.
[Claim 8]The playback equipment according to claim 1, wherein said control means controls said reproduced data storage holding state so that data volume of said non-regenerative data increases when fast forwarding reproduction is directed.
[Claim 9]The playback equipment according to claim 1, wherein said control means controls said reproduced data storage holding state based on a reproduction direction of said data.
[Claim 10]Playback equipment which has a reading means which reads a recording medium characterized by comprising the following with which data was recorded to data, a memory measure which memorizes data read by this reading means, and a control means which reads

data memorized by this memory measure and is reproduced.
A restoration means to memorize data read from said memory measure.
A reproduction means which reads restoration data which answered specific operation and was memorized by said restoration means, and is reproduced.

[Claim 11]The playback equipment according to claim 10, wherein said restoration means memorizes intermittently data read from said memory measure.
[Claim 12]The playback equipment according to claim 1, wherein said control means carries out a read rate which reads data in said recording medium earlier than read speed of reproduced data.
[Claim 13]The playback equipment according to claim 1, wherein said control means starts read-out of data within a memory measure from end position of rewinding reproduction in in data in which the hold stores of the end position of rewinding reproduction were carried out to said memory retaining means.
[Claim 14]Claim 1, wherein data regarded as reproduction having been completed by fast forwarding reproduction is processed as reproduced data, Claim 5, Claim 6, Claim 7, the playback equipment according to claim 8 or 9.
[Claim 15]A reading means which reads data in a recording medium with which data was recorded.
A memory measure which memorizes data read by this reading means.
A control means which reads data memorized by this memory measure and is reproduced.
It is playback equipment provided with the above, and said control means reads intermittently data memorized by said memory measure in the direction of ordinary reproduction, and the direction, when fast forwarding reproduction is directed during ordinary reproduction.

[Claim 16]In playback equipment which has a reading means which reads a recording medium with which data was recorded to data, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced, Playback equipment having a read speed alteration means which changes read speed by said control means so that it may become quick when fast forwarding reproduction is directed.
[Claim 17]In playback equipment which has a reading means which reads a recording medium with which data was recorded to data, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced, A fast-forwarding-reproduction means reproduced with data memorized by said memory measure when fast forwarding reproduction is directed, A transportation device to which it is made to move to a position on said recording medium with which said reading means read a data reading station of said reading means, and inner data was recorded during fast forwarding reproduction, Playback equipment having a data means for switching by which said reading means switches reproduction of said fast-forwarding-reproduction means to reproduction by data read in said recording medium after said reading means moved to a position during read-out on said recording medium and reading of it became possible.
[Claim 18]The playback equipment according to claim 17 having a starting means which starts said transportation device when it detects that data volume detected by data volume detection means to detect data volume memorized by said memory measure, and said data volume detection means turned into below the specified quantity.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]This invention stores temporarily in a memory the data read in the recording medium, relates to the playback equipment which has a function which plays music etc. based on the memorized data, and relates to the playback equipment which neither a sound break nor waiting time generates especially at the time of fast forwarding reproduction or rewinding reproduction.
[Description of the Prior Art]When playing CD (compact disk) and MD (mini disc), many data is read in a disk rather than the data needed for a reproducing output, and after memorizing in the memory for earthquake-proof which once consists of RAM, there are some which play a sound based on the data memorized by the memory. Thus, by once storing the data read in the disk in the memory for earthquake-proof, Skipping etc. can be prevented from generating by playing the data of this memory for earthquake-proof until an optical pickup returns to the state where data can be read again, even if the state where the data from a disk cannot be temporarily read by vibration etc. occurs. In the optical disk reproducing device which has such a memory for earthquake-proof. Since the data reading station of the optical pickup is progressing rather than the data storage position under reproduction, when a rapid traverse or rewinding reproduction is directed during reproduction, An optical pickup is returned to a prescribed position (data storage position under reproduction), and data is read in this position at usual reproduction speed or high speed to a forward direction or an opposite direction, and it changes into a sound, and rapid traverse or rewinding reproduction is performed.
[Problem(s) to be Solved by the Invention]However, in conventional playback equipment, since it had the composition of storing new data to the limit of memory space one by one in order to prevent skipping, regenerative data was eliminated immediately. For this reason, when looking back upon the music and the image which were played before for a while, it is necessary to return the data reading station of an optical pickup to that position, and to read data in recording media, such as CD, again. In the optical disk reproducing device which uses the memory for earthquake-proof, the data read position of the optical pickup is going to previous one considerably rather than the recording position of the data under sound reproduction. That is, the data under reproduction is read data only with an old part to have been accumulated in the memory. Therefore, when a rapid traverse or rewinding reproduction is directed. After moving the data reading station of an optical pickup to the position on which the data under sound reproduction in an optical disc is recorded, it is necessary to control tracking, a focus, etc. so that an optical pickup can read data. For this reason, there is a problem that a sound breaks off until it does in this way and can read data, or waiting time occurs. This invention was made in view of such a problem, and makes it SUBJECT to provide the playback equipment which suppressed generating of a sound break or waiting time at the time of fast forwarding reproduction or rewinding reproduction.
[Means for Solving the Problem]To achieve the above objects, in playback equipment characterized by comprising the following, this invention said control means, A thing controlling to read reproduced data which answered specific operation and was held at said memory measure, and to reproduce while controlling to hold a memory state to said memory measure of reproduced data which reproduction completed.
A reading means which reads data in a recording medium with which data was recorded.

A memory measure which memorizes data read by this reading means.
A control means which reads data memorized by this memory measure and is reproduced.
The direction of ordinary reproduction reads intermittently reproduced data held at said memory measure to an opposite direction, and said control means is reproduced, when rewinding reproduction is directed. Said memory measure thins out and holds said reproduced data. Said control means makes reproduction speed of said reproduced data quick, when rewinding reproduction is directed. Having a directing means which directs said reproduced data storage holding state, said control means controls said reproduced data storage holding state according to an operating condition of said directing means. Said control means controls said reproduced data storage holding state based on frequency where it becomes impossible for said reading means to read data in said recording medium. Said control means controls said reproduced data storage holding state based on a relation with data volume of said non-regenerative data memorized by said memory measure and reproduced data. When fast forwarding reproduction is directed, said control means controls said reproduced data storage holding state so that data volume of said non-regenerative data increases. Said control means controls said reproduced data storage holding state based on a reproduction direction of said data. This invention is characterized by that playback equipment which has a reading means which reads data in a recording medium with which data was recorded again, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced comprises:
A restoration means to memorize data read from said memory measure.
A reproduction means which reads restoration data which answered specific operation and was memorized by said restoration means, and is reproduced.
Said restoration means memorizes intermittently data read from said memory measure.Said control means carries out a read rate which reads data in said recording medium earlier than read speed of reproduced data. In in data in which the hold stores of the end position of rewinding reproduction were carried out to said memory retaining means, said control means starts read-out of data within a memory measure from end position of rewinding reproduction. Data regarded as reproduction having been completed by fast forwarding reproduction is processed as reproduced data. A reading means which reads data in a recording medium with which data was recorded, In playback equipment which it has, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced said control means, When fast forwarding reproduction is directed during ordinary reproduction, data memorized by said memory measure is intermittently read in the direction of ordinary reproduction, and the direction. A reading means which reads data in a recording medium with which data was recorded, In playback equipment which has a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced, When fast forwarding reproduction was directed, it had a read speed alteration means which changes read speed by said control means so that it may become quick. This invention is characterized by that playback equipment which has a reading means which reads data in a recording medium with which data was recorded again, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced comprises:
A fast-forwarding-reproduction means reproduced with data memorized by said memory measure when fast forwarding reproduction is directed.
A transportation device to which it is made to move to a position on said recording medium with

which said reading means read a data reading station of said reading means, and inner data was recorded during fast forwarding reproduction.
A data means for switching which switches reproduction of said fast-forwarding-reproduction means to reproduction by data which said reading means read in said recording medium after said reading means moves to a position during read-out on said recording medium and reading of it becomes possible.
When it detected that data volume detected by data volume detection means to detect data volume memorized by said memory measure, and said data volume detection means turned into below the specified quantity, it had a starting means which starts said transportation device.
[Embodiment of the Invention]Drawing 1 is a block diagram showing the composition of the disk reproduction device concerning a 1st embodiment of this invention. Hereafter, it explains using figures. 1 is disks with which voice data etc. were recorded, such as CD (compact disk) and MD (mini disc). 2 is an optical pickup which irradiates the signal recording surface of the disk 1 with a laser beam, detects the catoptric light, and reads data. 21 is a spindle motor for rotating the disk 1 with predetermined linear velocity. 22 is a delivery mechanism for moving the optical pickup 2 to the prescribed position (radial direction) of the disk 1 at high speed, and is constituted by a motor, feed screw, etc. 23 so that the optical pickup 2 can read data normally The output signal from the optical pickup 2. It is a servo circuit for performing what is called a feedback control focus servo [mechanism / 22 / the optical pickup 2, the spindle motor 21, and / delivery], a tracking servo, a spindle servo, and slide servo control based on (for example, the output of RF amplifier 31). 31 amplifies the data read by the optical pickup 2, and outputs it to the digital signal processing circuit 32, and it is an RF amplifier which generates the tracking error signal and focus error signal for applying feedback, and is outputted to the servo circuit 23. 32 is a digital signal processing circuit which performs signal processing, such as a recovery of the data which the optical pickup 2 read, and an error correction, and an output signal is once memorized via the memory control part 41 by the memory 4 for earthquake-proof. 4 is a memory for earthquake-proof which outputs the data which stored temporarily and memorized the data read in the disk 1 to the output circuit 5, When it becomes impossible to read data in the disk 1 by vibration etc. during playback, it is used as a buffer memory until the optical pickup 2 reads data again. 41 is a memory control part which controls the writing (memory) to the memory 4 for earthquake-proof, and read-out (reproduction (usually), fast forwarding reproduction, rewinding reproduction), and comprises a microcomputer, a logic circuit, etc. 5 is an output circuit which changes into analog data the data (digital) read from the memory 4 for earthquake-proof, and carries out voice response, and is constituted by the loudspeaker etc. which change a digital-to-analog conversion circuit, the power amplification circuit which amplifies the changed analog signal, and an electrical signal into an audio signal. 6 is a system control part which controls the whole system, and comprises a microcomputer etc. The system control part 6 is performing motion control of the memory control part 41, The state of the earthquake-proof memory 4 is grasped with the signal from the memory control part 41, and the whole system which, as a result, also includes the earthquake-proof memory 4 and the memory control part 41 by control of the system control part 6 can be controlled now. 7 is a final controlling element which consists of an operation key for performing various operator guidance, such as reproduction, fast forwarding reproduction, and rewinding reproduction. Drawing 2 is an explanatory view of the disk reproduction device concerning a 1st embodiment of this invention of operation, and, as for the figure in which (a) shows the data recording positions on a disk, and (b), the read-out constitutional diagram of the data at the time of fast forwarding reproduction/rewinding

reproduction and (d of the memory state figure of a memory and (c)) are the memory state figures of played data. Hereafter, it explains using figures. It is for this embodiment explaining the basic motion of the playback equipment of this invention. In the reproduction state of the disk reproduction device provided with the memory 4 for earthquake-proof. If a disk reproduction device is equipped with the disk 1, first, the read data from the disk 1 will be memorized in the free space of the memory 4 (the memory 4 is only called hereafter) for earthquake-proof, as shown in drawing 2 (b), and will turn into accumulation data for earthquake-proof (non-regenerative data). On the other hand, accumulation data is read from the prescribed position of the memory 4, and it is sent to the output circuit 5, and becomes voice response. In this case, the speed which reads data in the disk 1 and is memorized in the memory 4 is controlled to become quicker than the speed which reads accumulation data from the memory 4 for playback, and it will be stopped by reading of the data from the disk 1 if the data of the specified quantity is stored into the memory 4. Thus, reading from the disk 1 is controlled so that accumulation data becomes fixed. Therefore, as shown in drawing 2 (a), the data recording positions under reading of the optical pickup 2 will follow previously only the capacitive component (time to be equivalent to accumulation data) memorized by the memory 4 rather than the data recording positions under reproduction. Predetermined time (data volume corresponding to predetermined time) is not eliminated from the memory 4, but the data read for reproduction is left behind to the reproduced data storage area of the memory 4 as reproduced data. The ratio of the reproduced data storage area where the non-regenerative data storage area where accumulation data is memorized, and reproduced data are memorized is set up according to the purpose so that subsequent embodiments may be described. If it becomes impossible to read data in the disk 1 by vibration etc. during playback, the optical pickup 2 will perform a tracking servo, a focus servo, etc., and will read data in the position again. They are the data numbers (number which showed the order of the data list notionally) 7, 8, 9, 10, and 11 one by one about the accumulation data which is already read in the disk 1 in the meantime, and is stored in the non-regenerative data storage area of the memory 4 (memory).... Data is played. Skipping will not be generated, if it returns to the state where reading of data can perform the optical pickup 2 normally while there is this accumulation data (non-regenerative data). When fast forwarding reproduction is directed by the final controlling element 7 in this state, from the position (data number 6 of drawing 2 (c)) under reproduction. Intermittently, it reads one by one and reproduces so that accumulation data may be lengthened between the specified numbers set up beforehand (in this figure, they are the data numbers 7, 9, and 11 .... data is reproduced (in the case of 2X reproduction)). One by one intermittently so that reproduced data may be lengthened between the specified numbers set up beforehand from the position (data number 6 of drawing 2 (c)) under reproduction, if rewinding reproduction is directed in this state to an opposite direction. For example, in this example, they are the data numbers 5, 3, and 1.... Data is reproduced one by one (in the case of 2X rewinding reproduction). The reproduced data for rewinding which reproduction (read-out) completed, Since it is used as an object for search only when rewinding is directed, they are the data numbers 14, 13, 12, 11, and 10, for example.... Like data, The specific data beforehand set up among the data which did not need to leave continuous data and reproduction completed, Like drawing 2 (d), data is thinned out, for example and the capacity of the memory 4 can be effectively used by what it leaves intermittently the data of the data numbers 14, 10, 6, and 2 for (in the case of 4X rewinding reproduction). In this case, if rewinding reproduction is directed, rewinding reproduction will be possible by reading the data memorized in the non-regenerative data storage area of the memory 4 to an opposite direction as

it is. In a rapid traverse or rewinding reproduction, read intermittently the data memorized by the memory 4 and it does not reproduce, The reading speed of the continuous data (data numbers 15, 16, 17, 18, and 19 .... data) memorized by the memory 4 is increased n times, and it may be made to perform fast forwarding reproduction of n double speed. Similarly, in the case of rewinding reproduction, a reading speed is increased n times for the continuous data (data numbers 14, 13, 12, 11, and 10 .... data) memorized by the memory, and it may be made to perform rewinding reproduction of n double speed. The data currently recorded on the recording medium (disk 1), the image data (CD-ROM.) for playing the voice data (CD, MD, etc.) or picture information for playing speech information It is DVD etc. and fast forwarding reproduction, rewinding reproduction, still picture reproduction, rewinding top delivery reproduction, etc. can be performed by controlling read-out (a data number, a reading speed, etc. which should be read) from a memory measure (memory 4). Drawing 3 is a flow chart for which the processing which the system control part 6 of the disk reproduction device concerning a 1st embodiment of this invention performs is shown, and, as for processing and (b), processing and (c) of (a) are always regeneration at the time of PLAY (usually) at the time of fast forwarding reproduction/rewinding reproduction at the time of memory. Hereafter, it explains using figures. This processing is started from the state where the disk 1 was set in the disk reproduction device. First, memory of the data read in the disk 1 is explained using the flow chart of drawing 3 (a). This processing is always performed during operation of a disk reproduction device. In Step S11, it judges whether there is more reproduced data than the specified quantity, if there is more reproduced data than the specified quantity, it will move to Step S12, and if there is less reproduced data than the specified quantity, it will move to Step S13. That is, the non-regenerative data which was read in the disk 1 and memorized in the memory 4 in order to use the limited memory space effectively, The balance of the data volume of the reproduced data which it reads from the memory 4, and reproduction is completed, and is left behind to the memory 4 is taken into consideration, and data volume compares memory address Y in the memory 4 with the reproduction address X, and is judged. In Step S12, data is read in a disk, it memorizes in a memory, and processing is finished. That is, if it is in a state with little non-regenerative data with more played data than the specified quantity, and it becomes impossible to read data in the disk 1 when such, In the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that skipping (the read-out data from the memory 4 and the read data from a disk do not continue) may occur until it moves the optical pickup 2 to a prescribed position and readjustment is completed. When fast forwarding reproduction is directed and there is little data volume of the non-regenerative data in the memory 4, there is a possibility that a sound break (it is discontinuation of fast forwarding reproduction from the continuity of data) may occur for the same Reason. Then, data is read in the disk 1 and it memorizes in the memory 4 so that data volume of the non-regenerative data in the memory 4 may be increased. If new data is memorized by the memory 4, reproduced data will be overflowed and, as a result, the data volume of reproduced data will decrease. It is necessary to make the read rate of the data from the disk 1 quicker than the read speed (fast-forwarding-reproduction speed) from the memory 4 so that the data volume of non-regenerative data may not decrease, also when fast forwarding reproduction is directed. In Step S13, the memory to reading and the memory of data from a disk is stopped, and processing is finished. That is, if reproduced data is in states fewer than the specified quantity with much non-regenerative data, and rewinding reproduction is directed when such, By the reproduced data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it moves the optical pickup 2 to a prescribed position and

readjustment is completed. Then, overflow of the played data based on memory of new data is prevented, and reading of the data from the disk 1 and the memory to the memory 4 are stopped so that data volume of the played data in the memory 4 may be increased. Next, the processing at the time of fast forwarding reproduction and rewinding reproduction is explained using the flow chart of drawing 3 (b). This processing is performed by interruption, when fast forwarding reproduction/rewinding reproduction is directed by the final controlling element 7. In Step S21, if it judges whether fast forwarding reproduction was directed and fast forwarding reproduction is directed, it will move to Step S22, and if rewinding reproduction is directed, it will move to Step S23. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S22, it judges whether there is more non-regenerative data than the specified quantity, if there is more non-regenerative data than the specified quantity, it will move to Step S25, and if there is less non-regenerative data than the specified quantity, it will move to Step S23. That is, in the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it will move the optical pickup 2 to a prescribed position and adjustment will be completed, if there is more than no specified quantity [data volume / this] since the non-regenerative data in the memory 4 is used in fast forwarding reproduction. This specified quantity moves the optical pickup 2 to a prescribed position, and is decided corresponding to time until adjustment is completed. Data volume compares and judges memory address Y in the memory 4, and the reproduction address X. In Step S23, if it judges whether movement of the optical pickup was completed and movement of an optical pickup is completed, it will move to Step S30 and movement of an optical pickup will not be completed, it moves to Step S24. That is, it judges whether the optical pickup 2 has moved to the position (it continues) corresponding to a rapid traverse / rewinding reproduction data, and the position of the optical pickup 2 can be judged from the data number (address) of the read data. In Step S24, an optical pickup is moved and it moves to Step S24. That is, the optical pickup 2 is moved to a prescribed position at the same time it starts a rapid traverse/rewinding reproduction using the data memorized by the memory 4. For example, the optical pickup 2 is moved by a track jump etc. at high speed to the position (it continues) corresponding to a rapid traverse / rewinding reproduction data. In Step S25, the data of the address X is outputted and it moves to Step S26. That is, the data of the address X memorized by the memory 4 is read, and it reproduces. In Step S26, if it judges any should be directed between fast forwarding reproduction/rewinding reproduction and fast forwarding reproduction is directed, it will move to Step S27, and if rewinding reproduction is directed, it will move to Step S29. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S27, the data of the address X+2 is read and it reproduces. That is, only the data of specification (for example, it is the oddth in the case of double reproduction) in which non-regenerative data was beforehand set up in the direction which an address (data number) increases since it is fast forwarding reproduction is reproduced one by one intermittently (refer to drawing 2 (c)). In Step S28, overflow processing is carried out and processing is finished. That is, data is read in the disk 1 and it follows on memorizing in the memory 4, and one by one, from the memory 4, played data is overflowed and decreases in number so that the data of a reproduction direction may increase. In Step S29, the data of the address X-2 is read and it reproduces. That is, only the data of specification (for example, it is the oddth in the case of double reproduction) in which reproduced data was beforehand set up in the direction in which addresses (data number) decrease in number since it

is rewinding reproduction is intermittently reproduced to an opposite direction one by one (refer to drawing 2 (c)). When only the reproduced data of the specific address is intermittently memorized by the memory 4, the data memorized is reproduced to an opposite direction one by one (refer to drawing 2 (d)). In Step S30, read data is outputted (infanticide output) and it moves to Step S31. That is, since movement of the optical pickup 2 and adjustment were completed so that the data from the disk 1 could be read, it switches to the data read in the disk 1 from the data (non-regenerative data and played data are decided by a reproduction direction) memorized by the memory 4. The data read in the disk 1 is data of the continuous address, and when carrying out 2X fast forwarding reproduction, it outputs only the odd-numbered (data number) data to the output circuit 5 (infanticide output). In Step S31, read data is memorized in a memory and processing is finished. That is, it memorizes in the memory 4 by using as non-regenerative data the data read in the disk 1. In this case, since it is non-regenerative data required for reproduction, all the data of the continuous address is memorized. Then, regeneration is explained using the flow chart of drawing 3 (c) at the time of PLAY. This processing is performed by interruption, when reproduction (ordinary reproduction) is directed by the final controlling element 7. In Step S41, the data of the address X is read, and it outputs to an output circuit, and moves to Step S42. That is, the data of the address X memorized by the memory 4 is outputted to the output circuit 5. In Step S42, the data of the address X+1 is read and it outputs to an output circuit. That is, non-regenerative data is reproduced one by one in the direction which an address (data number) increases since it is reproduction. In Step S43, overflow processing is carried out and processing is finished. That is, data is read in the disk 1 and it follows on memorizing in the memory 4, and one by one, from the memory 4, played data is overflowed and decreases in number so that the data of a reproduction direction may increase. As mentioned above, according to this embodiment, when a rapid traverse/rewinding reproduction is directed during reproduction, the data memorized by the memory is used first, and since a rapid traverse/rewinding reproduction is started from the position under reproduction, waiting time is lost. Since it will switch to the read data based on an optical pickup from the read-out data from a memory if an optical pickup is moved to a prescribed position during the rapid traverse/rewinding reproduction by a memory and it will be in the state which can read data, Prolonged rapid traverse/rewinding reproduction become possible, without being restricted to the capacity of a memory. Drawing 4 is an explanatory view of the disk reproduction device concerning a 2nd embodiment of this invention of operation, and the memory state figure of the memory at the time of all the non-reproduction regions and (c of the flow chart for which (a) shows the processing which the system control part 6 performs, and (b)) are the memory state figures of the memory at the time of non-reproduction region expansion. (d) is usually a memory state figure of the memory at the time. Hereafter, it explains using figures. This processing is started from the state where the disk was set in the disk reproduction device. This embodiment makes proper the non-regenerative data and the reproduced data storage ratio in a memory. In Step S51, if it judges whether field change was operated and field change is operated, it will move to Step S52 and field change will not be operated, it moves to Step S53. That is, it judges from the state of the final controlling element 7 which the user operated. In the disk reproduction device for mount, since there are many possibilities that skipping may occur by vibration, a user is set up so that a non-regenerative data field may increase by a manual. In the user who uses rewinding reproduction frequently, it is set up so that a reproduced data area may increase, as a reproduced data area increases. In Step S52, renewal of a field is carried out in the operated direction, and processing is finished. In Step S53, if it judges whether fast forwarding

reproduction was directed and fast forwarding reproduction is directed, it will move to Step S54, and if rewinding reproduction (or ordinary reproduction) is directed, it will move to Step S55. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S54, a non-regenerative data field is expanded and processing is finished. That is, in the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it moves the optical pickup 2 to a prescribed position and adjustment is completed, if there is not much this data volume since the non-regenerative data in the memory 4 is used in fast forwarding reproduction. Therefore, a non-regenerative data field is expanded. In Step S55, expansion of the non-regenerative data field by fast forwarding reproduction is canceled, and it moves to Step S56. That is, in order to increase the data volume of reproduced data so that it can respond, when many non-regenerative data is unnecessary and rewinding reproduction is directed at the time of rewinding reproduction, the non-regenerative data field expanding processing expanded at the time of fast forwarding reproduction is canceled (it returns to the original data volume). In Step S56, the occurrence frequency of a reading error is judged, if the occurrence frequency of an error is large, it will move to Step S57, if the occurrence frequency of an error is a degree in the middle, it will move to Step S58, and if the occurrence frequency of an error is small, processing will be finished. That is, if a reading error occurs during reproduction, it is necessary to move and adjust the optical pickup 2 to a prescribed position each time. It is for judging the data volume of non-regenerative data required in order to keep reproduction from breaking off in the meantime using the data memorized by the memory 4. In Step S57, processing is finished by making all the fields into a non-regenerative data field. That is, the occurrence frequency of a reading error is large and it is necessary to perform movement of the optical pickup 2, and adjustment frequently. Reading of new data and memory cannot be performed but non-regenerative data continues decreasing in number in the meantime. Therefore, let all the fields of the memory 4 be non-regenerative data fields so that non-regenerative data may always become the maximum (refer to drawing 4 (b)). Although time is somewhat taken for it to become impossible to memorize reproduced data required at the time of rewinding reproduction as the result, and to be able to start rewinding reproduction, since it is an obstacle it is more serious for skipping to generate at the time of reproduction, non-regenerative data is increased for the measure against skipping on importance. In Step S58, a reproduced data area is decreased and processing is finished. That is, since the occurrence frequency of a reading error is a degree in the middle, a reproduced data area is decreased in consideration of the balance of the data volume of non-regenerative data and reproduced data, and it enables it to also memorize reproduced data to rewinding reproduction (refer to drawing 4 (c)). As mentioned above, according to this embodiment, since the ratio of the non-regenerative data field of a memory and a reproduced data area is changed according to the occurrence frequency of a reading error, the capacity of a memory can use effectively. Drawing 5 is an explanatory view of the disk reproduction device concerning a 3rd embodiment of this invention of operation, and (a) is a memory state figure of a memory when the flow chart which shows the processing which the system control part 6 performs, and (b) are switched to ordinary reproduction from rewinding reproduction. Hereafter, it explains using figures. In Step S61, when rewinding reproduction is directed, it is judged whether rewinding reproduction was completed only by the data (reproduced data) in the memory 4, If rewinding reproduction is completed only by the data (reproduced data) in the memory 4, it will move to Step S62 and rewinding reproduction will not be completed only by the data (reproduced data) in the memory

4, it moves to Step S63. That is, after rewinding reproduction is directed, like drawing 5 (b), rewinding reproduction is completed within the data memorized by the memory 4, and it is judged whether it was switched to ordinary reproduction. In the reading station of data, in Step S62, the read-out position of data finishes processing as a continuation of non-regenerative data as it is. That is, since rewinding reproduction is completed within the played data memorized by the memory 4 and it switches to ordinary reproduction, it is not necessary to move and adjust the optical pickup 2 to rewinding reproduction, and to newly read data in the disk 1. Then, a reading station (optical pickup position) is not changed (position just before rewinding reproduction is directed), but data is read in a continuation of the non-regenerative data already read in the time of switching to reproduction. The read-out position of the data from the memory 4 is read in the direction shown since all data was in the memory 4, and is reproduced. In Step S63, the read-out position of data finishes processing as a read end position accompanying rewinding reproduction in the reading station of a new reading station and data. That is, rewinding reproduction will not be completed within the played data memorized by the memory 4, but the optical pickup 2 will be moved and adjusted to rewinding reproduction, and data will newly be read in the disk 1. Then, reading of data is begun to a reproduction direction from the reading station (optical pickup position) at the time of switching to reproduction. It usually passes along the read-out position of the data from the memory 4 from the position (new reading station) which rewinding reproduction ended, and it reads data and is reproduced. Since movement of an optical pickup does not follow according to this embodiment as mentioned above in switching to ordinary reproduction from rewinding reproduction only by the data memorized in the memory, the waiting time for the change during each regeneration can be abolished. Drawing 6 is an explanatory view of the disk reproduction device concerning a 4th embodiment of this invention of operation, and it is a flow chart which shows the processing (whose b) the lineblock diagram of a memory performs (a) and the system control part 6 performs. Hereafter, it explains using figures. This embodiment sets aside the memory which memorizes non-regenerative data, and the memory which memorizes reproduced data, and makes reproduction control easy. 4a is the 1st memory that memorizes the non-regenerative data read in the disk 1. 4b is the 2nd memory (restoration means) that reads from the 1st memory 4a and memorizes the reproduced reproduced data. In Step S71, the data of the address X is outputted and it moves to Step S72. That is, the data of the predetermined address X of the non-regenerative data which reads in the disk 1 and is memorized by the 1st memory 4a is read, and it plays. In Step S72, it judges whether the number of the addresses X of the data read from the 1st memory 4a is even, if the number of the addresses X is even, it will move to Step S73, and if the number of the addresses X is not even (odd number), processing will be finished. That is, in ordinary reproduction, although the data of all the addresses is used, since intermittent data may be sufficient as the data memorized in the 2nd memory 4b for rewinding, an address chooses only the even-numbered data (reproduced data). In Step S73, an address memorizes the even-numbered data in the 2nd memory 4b, and finishes processing. That is, it memorizes in the 2nd memory 4b for rewinding. If rewinding reproduction is directed, it will reproduce from the 2nd memory 4b one by one to an opposite direction. The 1st memory 4a and the 2nd memory 4b do not need to be another memories in hard, and they may use the storage area of one memory for the 1st field (the 1st memory 4a) and the 2nd field (the 2nd memory 4b), classifying it beforehand. Since the memory used at the time of fast forwarding reproduction or rewinding reproduction by memorizing the non-regenerative data read in the disk in the 1st memory, and memorizing played data in distinction from the 2nd memory becomes another as mentioned above according to this

embodiment, The specification method etc. of the writing to a memory and reading control, for example, the memory address which write in and specifies a reading position, become easy. Although "rewinding reproduction" of the word used for explanation of each embodiment should be used in a tape player with the operation which originally rolls a tape, since it is generally used also in a disk player etc. in the sense of reverse direction reproduction, it is used in the meaning also with these Descriptions. There are reproduction, the method of reproducing at the speed, and the method of reproducing like fast forwarding reproduction at high speed in rewinding reproduction, and it can respond to both methods also in this embodiment.
[Effect of the Invention]As explained above, in this invention, the playback equipment which suppressed generating of a sound break or waiting time can be provided at the time of fast forwarding reproduction or rewinding reproduction.

TECHNICAL FIELD

[Field of the Invention]This invention stores temporarily in a memory the data read in the recording medium, relates to the playback equipment which has a function which plays music etc. based on the memorized data, and relates to the playback equipment which neither a sound break nor waiting time generates especially at the time of fast forwarding reproduction or rewinding reproduction.

PRIOR ART

[Description of the Prior Art]When playing CD (compact disk) and MD (mini disc), many data is read in a disk rather than the data needed for a reproducing output, and after memorizing in the memory for earthquake-proof which once consists of RAM, there are some which play a sound based on the data memorized by the memory. Thus, by once storing the data read in the disk in the memory for earthquake-proof, Skipping etc. can be prevented from generating by playing the data of this memory for earthquake-proof until an optical pickup returns to the state where data can be read again, even if the state where the data from a disk cannot be temporarily read by vibration etc. occurs. In the optical disk reproducing device which has such a memory for earthquake-proof. Since the data reading station of the optical pickup is progressing rather than the data storage position under reproduction, when a rapid traverse or rewinding reproduction is directed during reproduction, An optical pickup is returned to a prescribed position (data storage position under reproduction), and data is read in this position at usual reproduction speed or high speed to a forward direction or an opposite direction, and it changes into a sound, and rapid traverse or rewinding reproduction is performed.

EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, in this invention, the playback equipment which suppressed generating of a sound break or waiting time can be provided at the time of fast forwarding reproduction or rewinding reproduction.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in conventional playback equipment, since it had the composition of storing new data to the limit of memory space one by one in order to prevent skipping, regenerative data was eliminated immediately. For this reason, when looking back upon the music and the image which were played before for a while, it is necessary to return the data reading station of an optical pickup to that position, and to read data in recording media, such as CD, again. In the optical disk reproducing device which uses the memory for earthquake-proof, the data read position of the optical pickup is going to previous one considerably rather than the recording position of the data under sound reproduction. That is, the data under reproduction is read data only with an old part to have been accumulated in the memory. Therefore, when a rapid traverse or rewinding reproduction is directed. After moving the data reading station of an optical pickup to the position on which the data under sound reproduction in an optical disc is recorded, it is necessary to control tracking, a focus, etc. so that an optical pickup can read data. For this reason, there is a problem that a sound breaks off until it does in this way and can read data, or waiting time occurs. This invention was made in view of such a problem, and makes it SUBJECT to provide the playback equipment which suppressed generating of a sound break or waiting time at the time of fast forwarding reproduction or rewinding reproduction.

MEANS

[Means for Solving the Problem]To achieve the above objects, in playback equipment characterized by comprising the following, this invention said control means, A thing controlling to read reproduced data which answered specific operation and was held at said memory measure, and to reproduce while controlling to hold a memory state to said memory measure of reproduced data which reproduction completed.
A reading means which reads data in a recording medium with which data was recorded.
A memory measure which memorizes data read by this reading means.
A control means which reads data memorized by this memory measure and is reproduced.
The direction of ordinary reproduction reads intermittently reproduced data held at said memory measure to an opposite direction, and said control means is reproduced, when rewinding reproduction is directed. Said memory measure thins out and holds said reproduced data. Said control means makes reproduction speed of said reproduced data quick, when rewinding reproduction is directed. Having a directing means which directs said reproduced data storage holding state, said control means controls said reproduced data storage holding state according to an operating condition of said directing means. Said control means controls said reproduced data storage holding state based on frequency where it becomes impossible for said reading means to read data in said recording medium. Said control means controls said reproduced data storage holding state based on a relation with data volume of said non-regenerative data memorized by said memory measure and reproduced data. When fast forwarding reproduction is directed, said control means controls said reproduced data storage holding state so that data volume of said non-regenerative data increases. Said control means controls said reproduced data storage holding state based on a reproduction direction of said data. This invention is characterized by that playback equipment which has a reading means which reads data in a recording medium with which data was recorded again, a memory measure which memorizes data read by this

reading means, and a control means which reads data memorized by this memory measure and is reproduced comprises:
A restoration means to memorize data read from said memory measure.
A reproduction means which reads restoration data which answered specific operation and was memorized by said restoration means, and is reproduced.
Said restoration means memorizes intermittently data read from said memory measure.Said control means carries out a read rate which reads data in said recording medium earlier than read speed of reproduced data. In in data in which the hold stores of the end position of rewinding reproduction were carried out to said memory retaining means, said control means starts read-out of data within a memory measure from end position of rewinding reproduction. Data regarded as reproduction having been completed by fast forwarding reproduction is processed as reproduced data. A reading means which reads data in a recording medium with which data was recorded, In playback equipment which it has, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced said control means, When fast forwarding reproduction is directed during ordinary reproduction, data memorized by said memory measure is intermittently read in the direction of ordinary reproduction, and the direction. A reading means which reads data in a recording medium with which data was recorded, In playback equipment which has a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced, When fast forwarding reproduction was directed, it had a read speed alteration means which changes read speed by said control means so that it may become quick. This invention is characterized by that playback equipment which has a reading means which reads data in a recording medium with which data was recorded again, a memory measure which memorizes data read by this reading means, and a control means which reads data memorized by this memory measure and is reproduced comprises:
A fast-forwarding-reproduction means reproduced with data memorized by said memory measure when fast forwarding reproduction is directed.
A transportation device to which it is made to move to a position on said recording medium with which said reading means read a data reading station of said reading means, and inner data was recorded during fast forwarding reproduction.
A data means for switching which switches reproduction of said fast-forwarding-reproduction means to reproduction by data which said reading means read in said recording medium after said reading means moves to a position during read-out on said recording medium and reading of it becomes possible.
When it detected that data volume detected by data volume detection means to detect data volume memorized by said memory measure, and said data volume detection means turned into below the specified quantity, it had a starting means which starts said transportation device.
[Embodiment of the Invention]Drawing 1 is a block diagram showing the composition of the disk reproduction device concerning a 1st embodiment of this invention. Hereafter, it explains using figures. 1 is disks with which voice data etc. were recorded, such as CD (compact disk) and MD (mini disc). 2 is an optical pickup which irradiates the signal recording surface of the disk 1 with a laser beam, detects the catoptric light, and reads data. 21 is a spindle motor for rotating the disk 1 with predetermined linear velocity. 22 is a delivery mechanism for moving the optical pickup 2 to the prescribed position (radial direction) of the disk 1 at high speed, and is constituted by a motor, feed screw, etc. 23 so that the optical pickup 2 can read data normally The output signal from the optical pickup 2. It is a servo circuit for performing what is called a

feedback control focus servo [mechanism / 22 / the optical pickup 2, the spindle motor 21, and / delivery], a tracking servo, a spindle servo, and slide servo control based on (for example, the output of RF amplifier 31). 31 amplifies the data read by the optical pickup 2, and outputs it to the digital signal processing circuit 32, and it is an RF amplifier which generates the tracking error signal and focus error signal for applying feedback, and is outputted to the servo circuit 23. 32 is a digital signal processing circuit which performs signal processing, such as a recovery of the data which the optical pickup 2 read, and an error correction, and an output signal is once memorized via the memory control part 41 by the memory 4 for earthquake-proof. 4 is a memory for earthquake-proof which outputs the data which stored temporarily and memorized the data read in the disk 1 to the output circuit 5, When it becomes impossible to read data in the disk 1 by vibration etc. during playback, it is used as a buffer memory until the optical pickup 2 reads data again. 41 is a memory control part which controls the writing (memory) to the memory 4 for earthquake-proof, and read-out (reproduction (usually), fast forwarding reproduction, rewinding reproduction), and comprises a microcomputer, a logic circuit, etc. 5 is an output circuit which changes into analog data the data (digital) read from the memory 4 for earthquake-proof, and carries out voice response, and is constituted by the loudspeaker etc. which change a digital-to-analog conversion circuit, the power amplification circuit which amplifies the changed analog signal, and an electrical signal into an audio signal. 6 is a system control part which controls the whole system, and comprises a microcomputer etc. The system control part 6 is performing motion control of the memory control part 41, The state of the earthquake-proof memory 4 is grasped with the signal from the memory control part 41, and the whole system which, as a result, also includes the earthquake-proof memory 4 and the memory control part 41 by control of the system control part 6 can be controlled now. 7 is a final controlling element which consists of an operation key for performing various operator guidance, such as reproduction, fast forwarding reproduction, and rewinding reproduction. Drawing 2 is an explanatory view of the disk reproduction device concerning a 1st embodiment of this invention of operation, and, as for the figure in which (a) shows the data recording positions on a disk, and (b), the read-out constitutional diagram of the data at the time of fast forwarding reproduction/rewinding reproduction and (d of the memory state figure of a memory and (c)) are the memory state figures of played data. Hereafter, it explains using figures. It is for this embodiment explaining the basic motion of the playback equipment of this invention. In the reproduction state of the disk reproduction device provided with the memory 4 for earthquake-proof. If a disk reproduction device is equipped with the disk 1, first, the read data from the disk 1 will be memorized in the free space of the memory 4 (the memory 4 is only called hereafter) for earthquake-proof, as shown in drawing 2 (b), and will turn into accumulation data for earthquake-proof (non-regenerative data). On the other hand, accumulation data is read from the prescribed position of the memory 4, and it is sent to the output circuit 5, and becomes voice response. In this case, the speed which reads data in the disk 1 and is memorized in the memory 4 is controlled to become quicker than the speed which reads accumulation data from the memory 4 for playback, and it will be stopped by reading of the data from the disk 1 if the data of the specified quantity is stored into the memory 4. Thus, reading from the disk 1 is controlled so that accumulation data becomes fixed. Therefore, as shown in drawing 2 (a), the data recording positions under reading of the optical pickup 2 will follow previously only the capacitive component (time to be equivalent to accumulation data) memorized by the memory 4 rather than the data recording positions under reproduction. Predetermined time (data volume corresponding to predetermined time) is not eliminated from the memory 4, but the data read for

reproduction is left behind to the reproduced data storage area of the memory 4 as reproduced data. The ratio of the reproduced data storage area where the non-regenerative data storage area where accumulation data is memorized, and reproduced data are memorized is set up according to the purpose so that subsequent embodiments may be described. If it becomes impossible to read data in the disk 1 by vibration etc. during playback, the optical pickup 2 will perform a tracking servo, a focus servo, etc., and will read data in the position again. They are the data numbers (number which showed the order of the data list notionally) 7, 8, 9, 10, and 11 one by one about the accumulation data which is already read in the disk 1 in the meantime, and is stored in the non-regenerative data storage area of the memory 4 (memory).... Data is played. Skipping will not be generated, if it returns to the state where reading of data can perform the optical pickup 2 normally while there is this accumulation data (non-regenerative data). When fast forwarding reproduction is directed by the final controlling element 7 in this state, from the position (data number 6 of drawing 2 (c)) under reproduction. Intermittently, it reads one by one and reproduces so that accumulation data may be lengthened between the specified numbers set up beforehand (in this figure, they are the data numbers 7, 9, and 11 .... data is reproduced (in the case of 2X reproduction)). One by one intermittently so that reproduced data may be lengthened between the specified numbers set up beforehand from the position (data number 6 of drawing 2 (c)) under reproduction, if rewinding reproduction is directed in this state to an opposite direction. For example, in this example, they are the data numbers 5, 3, and 1.... Data is reproduced one by one (in the case of 2X rewinding reproduction). The reproduced data for rewinding which reproduction (read-out) completed, Since it is used as an object for search only when rewinding is directed, they are the data numbers 14, 13, 12, 11, and 10, for example.... Like data, The specific data beforehand set up among the data which did not need to leave continuous data and reproduction completed, Like drawing 2 (d), data is thinned out, for example and the capacity of the memory 4 can be effectively used by what it leaves intermittently the data of the data numbers 14, 10, 6, and 2 for (in the case of 4X rewinding reproduction). In this case, if rewinding reproduction is directed, rewinding reproduction will be possible by reading the data memorized in the non-regenerative data storage area of the memory 4 to an opposite direction as it is. In a rapid traverse or rewinding reproduction, read intermittently the data memorized by the memory 4 and it does not reproduce, The reading speed of the continuous data (data numbers 15, 16, 17, 18, and 19 .... data) memorized by the memory 4 is increased n times, and it may be made to perform fast forwarding reproduction of n double speed. Similarly, in the case of rewinding reproduction, a reading speed is increased n times for the continuous data (data numbers 14, 13, 12, 11, and 10 .... data) memorized by the memory, and it may be made to perform rewinding reproduction of n double speed. The data currently recorded on the recording medium (disk 1), the image data (CD-ROM.) for playing the voice data (CD, MD, etc.) or picture information for playing speech information It is DVD etc. and fast forwarding reproduction, rewinding reproduction, still picture reproduction, rewinding top delivery reproduction, etc. can be performed by controlling read-out (a data number, a reading speed, etc. which should be read) from a memory measure (memory 4). Drawing 3 is a flow chart for which the processing which the system control part 6 of the disk reproduction device concerning a 1st embodiment of this invention performs is shown, and, as for processing and (b), processing and (c) of (a) are always regeneration at the time of PLAY (usually) at the time of fast forwarding reproduction/rewinding reproduction at the time of memory. Hereafter, it explains using figures. This processing is started from the state where the disk 1 was set in the disk reproduction device. First, memory of the data read in the disk 1 is explained using the flow chart of drawing 3 (a). This processing is

always performed during operation of a disk reproduction device. In Step S11, it judges whether there is more reproduced data than the specified quantity, if there is more reproduced data than the specified quantity, it will move to Step S12, and if there is less reproduced data than the specified quantity, it will move to Step S13. That is, the non-regenerative data which was read in the disk 1 and memorized in the memory 4 in order to use the limited memory space effectively, The balance of the data volume of the reproduced data which it reads from the memory 4, and reproduction is completed, and is left behind to the memory 4 is taken into consideration, and data volume compares memory address Y in the memory 4 with the reproduction address X, and is judged. In Step S12, data is read in a disk, it memorizes in a memory, and processing is finished. That is, if it is in a state with little non-regenerative data with more played data than the specified quantity, and it becomes impossible to read data in the disk 1 when such, In the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that skipping (the read-out data from the memory 4 and the read data from a disk do not continue) may occur until it moves the optical pickup 2 to a prescribed position and readjustment is completed. When fast forwarding reproduction is directed and there is little data volume of the non-regenerative data in the memory 4, there is a possibility that a sound break (it is discontinuation of fast forwarding reproduction from the continuity of data) may occur for the same Reason. Then, data is read in the disk 1 and it memorizes in the memory 4 so that data volume of the non-regenerative data in the memory 4 may be increased. If new data is memorized by the memory 4, reproduced data will be overflowed and, as a result, the data volume of reproduced data will decrease. It is necessary to make the read rate of the data from the disk 1 quicker than the read speed (fast-forwarding-reproduction speed) from the memory 4 so that the data volume of non-regenerative data may not decrease, also when fast forwarding reproduction is directed. In Step S13, the memory to reading and the memory of data from a disk is stopped, and processing is finished. That is, if reproduced data is in states fewer than the specified quantity with much non-regenerative data, and rewinding reproduction is directed when such, By the reproduced data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it moves the optical pickup 2 to a prescribed position and readjustment is completed. Then, overflow of the played data based on memory of new data is prevented, and reading of the data from the disk 1 and the memory to the memory 4 are stopped so that data volume of the played data in the memory 4 may be increased. Next, the processing at the time of fast forwarding reproduction and rewinding reproduction is explained using the flow chart of drawing 3 (b). This processing is performed by interruption, when fast forwarding reproduction/rewinding reproduction is directed by the final controlling element 7. In Step S21, if it judges whether fast forwarding reproduction was directed and fast forwarding reproduction is directed, it will move to Step S22, and if rewinding reproduction is directed, it will move to Step S23. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S22, it judges whether there is more non-regenerative data than the specified quantity, if there is more non-regenerative data than the specified quantity, it will move to Step S25, and if there is less non-regenerative data than the specified quantity, it will move to Step S23. That is, in the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it will move the optical pickup 2 to a prescribed position and adjustment will be completed, if there is more than no specified quantity [data volume / this] since the non-regenerative data in the memory 4 is used in fast forwarding reproduction. This specified quantity moves the optical pickup 2 to a prescribed position, and is decided

corresponding to time until adjustment is completed. Data volume compares and judges memory address Y in the memory 4, and the reproduction address X. In Step S23, if it judges whether movement of the optical pickup was completed and movement of an optical pickup is completed, it will move to Step S30 and movement of an optical pickup will not be completed, it moves to Step S24. That is, it judges whether the optical pickup 2 has moved to the position (it continues) corresponding to a rapid traverse / rewinding reproduction data, and the position of the optical pickup 2 can be judged from the data number (address) of the read data. In Step S24, an optical pickup is moved and it moves to Step S24. That is, the optical pickup 2 is moved to a prescribed position at the same time it starts a rapid traverse/rewinding reproduction using the data memorized by the memory 4. For example, the optical pickup 2 is moved by a track jump etc. at high speed to the position (it continues) corresponding to a rapid traverse / rewinding reproduction data. In Step S25, the data of the address X is outputted and it moves to Step S26. That is, the data of the address X memorized by the memory 4 is read, and it reproduces. In Step S26, if it judges any should be directed between fast forwarding reproduction/rewinding reproduction and fast forwarding reproduction is directed, it will move to Step S27, and if rewinding reproduction is directed, it will move to Step S29. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S27, the data of the address X+2 is read and it reproduces. That is, only the data of specification (for example, it is the oddth in the case of double reproduction) in which non-regenerative data was beforehand set up in the direction which an address (data number) increases since it is fast forwarding reproduction is reproduced one by one intermittently (refer to drawing 2 (c)). In Step S28, overflow processing is carried out and processing is finished. That is, data is read in the disk 1 and it follows on memorizing in the memory 4, and one by one, from the memory 4, played data is overflowed and decreases in number so that the data of a reproduction direction may increase. In Step S29, the data of the address X-2 is read and it reproduces. That is, only the data of specification (for example, it is the oddth in the case of double reproduction) in which reproduced data was beforehand set up in the direction in which addresses (data number) decrease in number since it is rewinding reproduction is intermittently reproduced to an opposite direction one by one (refer to drawing 2 (c)). When only the reproduced data of the specific address is intermittently memorized by the memory 4, the data memorized is reproduced to an opposite direction one by one (refer to drawing 2 (d)). In Step S30, read data is outputted (infanticide output) and it moves to Step S31. That is, since movement of the optical pickup 2 and adjustment were completed so that the data from the disk 1 could be read, it switches to the data read in the disk 1 from the data (non-regenerative data and played data are decided by a reproduction direction) memorized by the memory 4. The data read in the disk 1 is data of the continuous address, and when carrying out 2X fast forwarding reproduction, it outputs only the odd-numbered (data number) data to the output circuit 5 (infanticide output). In Step S31, read data is memorized in a memory and processing is finished. That is, it memorizes in the memory 4 by using as non-regenerative data the data read in the disk 1. In this case, since it is non-regenerative data required for reproduction, all the data of the continuous address is memorized. Then, regeneration is explained using the flow chart of drawing 3 (c) at the time of PLAY. This processing is performed by interruption, when reproduction (ordinary reproduction) is directed by the final controlling element 7. In Step S41, the data of the address X is read, and it outputs to an output circuit, and moves to Step S42. That is, the data of the address X memorized by the memory 4 is outputted to the output circuit 5. In Step S42, the data of the address X+1 is read and it outputs to

an output circuit. That is, non-regenerative data is reproduced one by one in the direction which an address (data number) increases since it is reproduction. In Step S43, overflow processing is carried out and processing is finished. That is, data is read in the disk 1 and it follows on memorizing in the memory 4, and one by one, from the memory 4, played data is overflowed and decreases in number so that the data of a reproduction direction may increase. As mentioned above, according to this embodiment, when a rapid traverse/rewinding reproduction is directed during reproduction, the data memorized by the memory is used first, and since a rapid traverse/rewinding reproduction is started from the position under reproduction, waiting time is lost. Since it will switch to the read data based on an optical pickup from the read-out data from a memory if an optical pickup is moved to a prescribed position during the rapid traverse/rewinding reproduction by a memory and it will be in the state which can read data, Prolonged rapid traverse/rewinding reproduction become possible, without being restricted to the capacity of a memory. Drawing 4 is an explanatory view of the disk reproduction device concerning a 2nd embodiment of this invention of operation, and the memory state figure of the memory at the time of all the non-reproduction regions and (c of the flow chart for which (a) shows the processing which the system control part 6 performs, and (b)) are the memory state figures of the memory at the time of non-reproduction region expansion. (d) is usually a memory state figure of the memory at the time. Hereafter, it explains using figures. This processing is started from the state where the disk was set in the disk reproduction device. This embodiment makes proper the non-regenerative data and the reproduced data storage ratio in a memory. In Step S51, if it judges whether field change was operated and field change is operated, it will move to Step S52 and field change will not be operated, it moves to Step S53. That is, it judges from the state of the final controlling element 7 which the user operated. In the disk reproduction device for mount, since there are many possibilities that skipping may occur by vibration, a user is set up so that a non-regenerative data field may increase by a manual. In the user who uses rewinding reproduction frequently, it is set up so that a reproduced data area may increase, as a reproduced data area increases. In Step S52, renewal of a field is carried out in the operated direction, and processing is finished. In Step S53, if it judges whether fast forwarding reproduction was directed and fast forwarding reproduction is directed, it will move to Step S54, and if rewinding reproduction (or ordinary reproduction) is directed, it will move to Step S55. That is, it judges any should be directed between fast forwarding reproduction or rewinding reproduction from the state of the final controlling element 7 which the user operated. In Step S54, a non-regenerative data field is expanded and processing is finished. That is, in the non-regenerative data in few memories 4, it cannot be coped with but there is a possibility that a sound break may occur until it moves the optical pickup 2 to a prescribed position and adjustment is completed, if there is not much this data volume since the non-regenerative data in the memory 4 is used in fast forwarding reproduction. Therefore, a non-regenerative data field is expanded. In Step S55, expansion of the non-regenerative data field by fast forwarding reproduction is canceled, and it moves to Step S56. That is, in order to increase the data volume of reproduced data so that it can respond, when many non-regenerative data is unnecessary and rewinding reproduction is directed at the time of rewinding reproduction, the non-regenerative data field expanding processing expanded at the time of fast forwarding reproduction is canceled (it returns to the original data volume). In Step S56, the occurrence frequency of a reading error is judged, if the occurrence frequency of an error is large, it will move to Step S57, if the occurrence frequency of an error is a degree in the middle, it will move to Step S58, and if the occurrence frequency of an error is small, processing will be finished. That is, if a reading error

occurs during reproduction, it is necessary to move and adjust the optical pickup 2 to a prescribed position each time. It is for judging the data volume of non-regenerative data required in order to keep reproduction from breaking off in the meantime using the data memorized by the memory 4. In Step S57, processing is finished by making all the fields into a non-regenerative data field. That is, the occurrence frequency of a reading error is large and it is necessary to perform movement of the optical pickup 2, and adjustment frequently. Reading of new data and memory cannot be performed but non-regenerative data continues decreasing in number in the meantime. Therefore, let all the fields of the memory 4 be non-regenerative data fields so that non-regenerative data may always become the maximum (refer to drawing 4 (b)). Although time is somewhat taken for it to become impossible to memorize reproduced data required at the time of rewinding reproduction as the result, and to be able to start rewinding reproduction, since it is an obstacle it is more serious for skipping to generate at the time of reproduction, non-regenerative data is increased for the measure against skipping on importance. In Step S58, a reproduced data area is decreased and processing is finished. That is, since the occurrence frequency of a reading error is a degree in the middle, a reproduced data area is decreased in consideration of the balance of the data volume of non-regenerative data and reproduced data, and it enables it to also memorize reproduced data to rewinding reproduction (refer to drawing 4 (c)). As mentioned above, according to this embodiment, since the ratio of the non-regenerative data field of a memory and a reproduced data area is changed according to the occurrence frequency of a reading error, the capacity of a memory can use effectively. Drawing 5 is an explanatory view of the disk reproduction device concerning a 3rd embodiment of this invention of operation, and (a) is a memory state figure of a memory when the flow chart which shows the processing which the system control part 6 performs, and (b) are switched to ordinary reproduction from rewinding reproduction. Hereafter, it explains using figures. In Step S61, when rewinding reproduction is directed, it is judged whether rewinding reproduction was completed only by the data (reproduced data) in the memory 4, If rewinding reproduction is completed only by the data (reproduced data) in the memory 4, it will move to Step S62 and rewinding reproduction will not be completed only by the data (reproduced data) in the memory 4, it moves to Step S63. That is, after rewinding reproduction is directed, like drawing 5 (b), rewinding reproduction is completed within the data memorized by the memory 4, and it is judged whether it was switched to ordinary reproduction. In the reading station of data, in Step S62, the read-out position of data finishes processing as a continuation of non-regenerative data as it is. That is, since rewinding reproduction is completed within the played data memorized by the memory 4 and it switches to ordinary reproduction, it is not necessary to move and adjust the optical pickup 2 to rewinding reproduction, and to newly read data in the disk 1. Then, a reading station (optical pickup position) is not changed (position just before rewinding reproduction is directed), but data is read in a continuation of the non-regenerative data already read in the time of switching to reproduction. The read-out position of the data from the memory 4 is read in the direction shown since all data was in the memory 4, and is reproduced. In Step S63, the read-out position of data finishes processing as a read end position accompanying rewinding reproduction in the reading station of a new reading station and data. That is, rewinding reproduction will not be completed within the played data memorized by the memory 4, but the optical pickup 2 will be moved and adjusted to rewinding reproduction, and data will newly be read in the disk 1. Then, reading of data is begun to a reproduction direction from the reading station (optical pickup position) at the time of switching to reproduction. It usually passes along the read-out position of the data from the memory 4 from the position (new reading station) which rewinding

reproduction ended, and it reads data and is reproduced. Since movement of an optical pickup does not follow according to this embodiment as mentioned above in switching to ordinary reproduction from rewinding reproduction only by the data memorized in the memory, the waiting time for the change during each regeneration can be abolished. Drawing 6 is an explanatory view of the disk reproduction device concerning a 4th embodiment of this invention of operation, and it is a flow chart which shows the processing (whose b) the lineblock diagram of a memory performs (a) and the system control part 6 performs. Hereafter, it explains using figures. This embodiment sets aside the memory which memorizes non-regenerative data, and the memory which memorizes reproduced data, and makes reproduction control easy. 4a is the 1st memory that memorizes the non-regenerative data read in the disk 1. 4b is the 2nd memory (restoration means) that reads from the 1st memory 4a and memorizes the reproduced reproduced data. In Step S71, the data of the address X is outputted and it moves to Step S72. That is, the data of the predetermined address X of the non-regenerative data which reads in the disk 1 and is memorized by the 1st memory 4a is read, and it plays. In Step S72, it judges whether the number of the addresses X of the data read from the 1st memory 4a is even, if the number of the addresses X is even, it will move to Step S73, and if the number of the addresses X is not even (odd number), processing will be finished. That is, in ordinary reproduction, although the data of all the addresses is used, since intermittent data may be sufficient as the data memorized in the 2nd memory 4b for rewinding, an address chooses only the even-numbered data (reproduced data). In Step S73, an address memorizes the even-numbered data in the 2nd memory 4b, and finishes processing. That is, it memorizes in the 2nd memory 4b for rewinding. If rewinding reproduction is directed, it will reproduce from the 2nd memory 4b one by one to an opposite direction. The 1st memory 4a and the 2nd memory 4b do not need to be another memories in hard, and they may use the storage area of one memory for the 1st field (the 1st memory 4a) and the 2nd field (the 2nd memory 4b), classifying it beforehand. Since the memory used at the time of fast forwarding reproduction or rewinding reproduction by memorizing the non-regenerative data read in the disk in the 1st memory, and memorizing played data in distinction from the 2nd memory becomes another as mentioned above according to this embodiment, The specification method etc. of the writing to a memory and reading control, for example, the memory address which write in and specifies a reading position, become easy. Although "rewinding reproduction" of the word used for explanation of each embodiment should be used in a tape player with the operation which originally rolls a tape, since it is generally used also in a disk player etc. in the sense of reverse direction reproduction, it is used in the meaning also with these Descriptions. There are reproduction, the method of reproducing at the speed, and the method of reproducing like fast forwarding reproduction at high speed in rewinding reproduction, and it can respond to both methods also in this embodiment.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a block diagram showing the composition of the disk reproduction device concerning a 1st embodiment of this invention.
[Drawing 2]It is an explanatory view of the disk reproduction device concerning a 1st embodiment of this invention of operation.

[Drawing 3]It is a flow chart which shows the processing which the system control part 6 of the disk reproduction device concerning a 1st embodiment of this invention performs.
[Drawing 4]It is an explanatory view of the disk reproduction device concerning a 2nd embodiment of this invention of operation.
[Drawing 5]It is an explanatory view of the disk reproduction device concerning a 3rd embodiment of this invention of operation.
[Drawing 6]It is an explanatory view of the disk reproduction device concerning a 4th embodiment of this invention of operation.
[Description of Notations]
1 .... A disk and 32 ... A digital signal processing circuit, 2 .... Optical pickup, 4 [... A delivery mechanism and 5 / .... An output circuit, 23 / ... A servo circuit and 6 / .... A system control part, 31 / ... An RF amplifier and 7 / .... Final controlling element.] .... The memory for earthquake-proof, 21 ... A spindle motor and 41 ... A memory control part, 22

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2000－285589
（P2000－285589A）
(43)公開日　平成12年10月13日(2000.10.13)

(51)Int.Cl.⁷	識別記号	ＦＩ	ﾃｰﾏｺｰﾄﾞ(参考)
Ｇ１１Ｂ　20/10		Ｇ１１Ｂ　20/10	Ａ　５Ｄ０４４

審査請求　未請求　請求項の数18　ＯＬ　（全 10 頁）

(21)出願番号　特願平11－94570

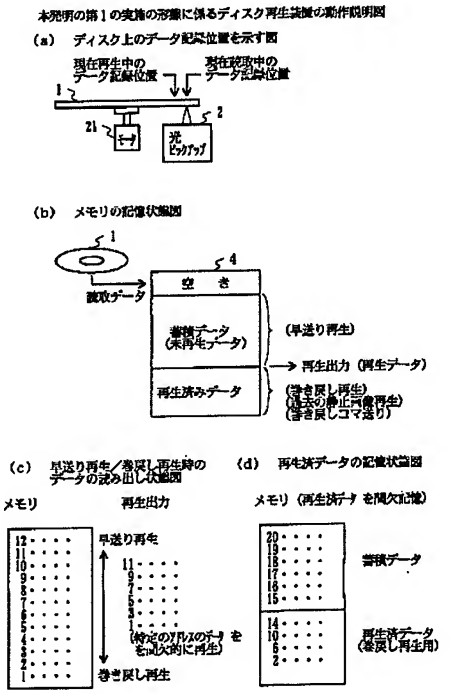
(22)出願日　平成11年４月１日(1999.4.1)

(71)出願人　00023592
富士通テン株式会社
兵庫県神戸市兵庫区御所通１丁目２番28号
(72)発明者　濱田　茂樹
兵庫県神戸市兵庫区御所通１丁目２番28号
富士通テン株式会社内
(72)発明者　勝野　雅之
兵庫県神戸市兵庫区御所通１丁目２番28号
富士通テン株式会社内
(72)発明者　小山　宏満
兵庫県神戸市兵庫区御所通１丁目２番28号
富士通テン株式会社内

Ｆターム(参考)　5D044 BC03 BC06 CC04 FG10 FG23
FG24 GK11 HH05

(54)【発明の名称】　再生装置

(57)【要約】
【課題】早送り再生や巻き戻し再生時に、音途切れや待ち時間の発生を抑えた再生装置を提供する。
【解決手段】データの記録された記録媒体からデータを読み取る読取手段と、読取手段により読み取られたデータを記憶する記憶手段と、記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、制御手段は、再生が完了した再生済データの記憶手段への記憶状態を保持するように制御するとともに、特定操作に応答して記憶手段に保持された再生済データを読み出して再生するように制御する。また、早送り再生や巻き戻し再生が指示された時に、先ず、記憶手段に記憶されている未再生データや再生済データを使用して再生を開始し、その間に記録媒体からデータが読み取れるように調整して、読取可能な状態になると読取データを切り換える。



【特許請求の範囲】

【請求項１】　データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、
前記制御手段は、
再生が完了した再生済データの前記記憶手段への記憶状態を保持するように制御するとともに、特定操作に応答して前記記憶手段に保持された再生済データを読み出して再生するように制御することを特徴とする再生装置。

【請求項２】　前記制御手段は、
巻き戻し再生が指示された時に、前記記憶手段に保持された再生済データを、通常再生方向とは逆方向に間欠的に読み出して再生することを特徴とする請求項１記載の再生装置。

【請求項３】　前記記憶手段は、前記再生済データを間引いて保持することを特徴とする請求項１記載の再生装置。

【請求項４】　前記制御手段は、
巻き戻し再生が指示された時に、前記再生済データの再生速度を速くすることを特徴とする請求項１記載の再生装置。

【請求項５】　前記再生済データの記憶保持状態を指示する指示手段を有し、
前記制御手段は、
前記指示手段の操作状態に応じて前記再生済データの記憶保持状態を制御することを特徴とする請求項１記載の再生装置。

【請求項６】　前記制御手段は、
前記読取手段が、前記記録媒体からデータが読み取れなくなる頻度に基いて、前記再生済データの記憶保持状態を制御することを特徴とする請求項５記載の再生装置。

【請求項７】　前記制御手段は、
前記記憶手段に記憶されている前記未再生データと再生済データのデータ量との関係に基づき、前記再生済データの記憶保持状態を制御することを特徴とする請求項１記載の再生装置。

【請求項８】　前記制御手段は、
早送り再生が指示された時には、前記未再生データのデータ量が多くなるように前記再生済データの記憶保持状態を制御することを特徴とする請求項１記載の再生装置。

【請求項９】　前記制御手段は、
前記データの再生方向に基いて、前記再生済データの記憶保持状態を制御することを特徴とする請求項１記載の再生装置。

【請求項１０】　データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、
前記記憶手段から読み出したデータを記憶する再記憶手段と、
特定操作に応答して前記再記憶手段に記憶された再記憶データを読み出して再生する再生手段とを備えたことを特徴とする再生装置。

【請求項１１】　前記再記憶手段は、
前記記憶手段から読み出したデータを間欠的に記憶することを特徴とする請求項１０記載の再生装置。

【請求項１２】　前記制御手段は、前記記録媒体からデータを読み取る読取速度を、再生済データの読出速度よりも早くすることを特徴とする請求項１記載の再生装置。

【請求項１３】　前記制御手段は、
巻き戻し再生の終了位置が前記記憶保持手段に記憶保持されたデータ内の場合、巻き戻し再生の終了位置から記憶手段内のデータの読み出しを開始することを特徴とする請求項１記載の再生装置。

【請求項１４】　早送り再生により再生が完了したと見なされるデータは、再生済データとして処理されることを特徴とする請求項１、請求項５、請求項６、請求項７、請求項８または請求項９記載の再生装置。

【請求項１５】　データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、
前記制御手段は、
通常再生中に早送り再生が指示された時に、前記記憶手段に記憶されているデータを通常再生方向と同方向に間欠的に読み出すことを特徴とする再生装置。

【請求項１６】　データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、
早送り再生が指示された時に、前記制御手段による読出速度を速くなるように変更する読出速度変更手段を備えたことを特徴とする再生装置。

【請求項１７】　データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、
早送り再生が指示された時に、前記記憶手段に記憶されているデータにより再生を行う早送り再生手段と、
早送り再生中に前記読取手段のデータ読取位置を、前記読出手段が読み出し中のデータが記録された前記記録媒体上の位置まで移動させる移動手段と、

前記読取手段が前記記録媒体上の読出中位置まで移動し、読取り可能となった後に、前記早送り再生手段の再生を、前記読取手段が前記記録媒体から読み取ったデータによる再生に切り換えるデータ切換手段とを備えたことを特徴とする再生装置。

【請求項１８】　前記記憶手段に記憶されているデータ量を検出するデータ量検出手段と、

前記データ量検出手段により検出されたデータ量が所定量以下になったことを検出した時に、前記移動手段を起動する起動手段とを備えたことを特徴とする請求項１７記載の再生装置。

【発明の詳細な説明】

【発明の属する技術分野】本発明は、記録媒体から読み取ったデータをメモリに一時記憶し、その記憶しているデータに基づいて音楽等の再生を行う機能を有する再生装置に係り、特に、早送り再生や巻き戻し再生時に、音途切れや待ち時間の発生しない再生装置に関する。

【従来の技術】ＣＤ（コンパクトディスク）やＭＤ（ミニディスク）を再生する場合、再生出力に必要とされるデータよりも多くのデータをディスクから読み取り、一旦ＲＡＭからなる耐震用メモリに記憶した後、そのメモリに記憶されたデータに基づき音声を再生するものがある。このように、ディスクから読み取ったデータを一旦耐震用メモリに蓄積することにより、振動等で一時的にディスクからのデータが読み取れない状態が発生しても、光ピックアップが再度データを読み取れる状態に復帰するまで、この耐震用メモリのデータを再生することにより、音飛び等が発生しないようにできる。このような耐震用メモリを有する光ディスク再生装置では、再生中のデータ記憶位置よりも光ピックアップのデータ読取位置が進んでいるので、再生中に早送りまたは巻き戻し再生が指示された時には、光ピックアップを所定位置（再生中のデータ記憶位置）まで戻し、この位置から順方向あるいは逆方向に、通常の再生速度あるいは高速でデータを読み取り、そして音声に変換して早送りまたは巻き戻し再生を行っている。

【発明が解決しようとする課題】しかしながら、従来の再生装置では音飛びを防止するために順次新しいデータをメモリ容量一杯に蓄える構成となっているために、再生データはすぐに消去されていた。このため、少し前に再生した音楽や映像を振り返る時には、その位置まで光ピックアップのデータ読取位置を戻し、ＣＤ等の記録媒体から再度データを読み取る必要がある。耐震用メモリを使用した光ディスク再生装置では、光ピックアップのデータ読み取り位置が音声再生中のデータの記録位置よりも、かなり先の方に進んでいる。つまり、再生中のデータはメモリに蓄積された分だけ古い読取データである。そのために、早送りまたは巻き戻し再生が指示された時には、光ディスクにおける音声再生中のデータが記録されている位置まで光ピックアップのデータ読取位置を移動した後、光ピックアップがデータを読み取れるように、トラッキング、フォーカス等の制御をする必要がある。このため、このようにしてデータが読み取れるまでの間は音が途切れたり、待ち時間が発生するという問題がある。本発明は、このような問題に鑑みなされたもので、早送り再生や巻き戻し再生時に、音途切れや待ち時間の発生を抑えた再生装置を提供することを課題とする。

【課題を解決するための手段】上記目的を達成するために本発明は、データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、前記制御手段は、再生が完了した再生済データの前記記憶手段への記憶状態を保持するように制御するとともに、特定操作に応答して前記記憶手段に保持された再生済データを読み出して再生するように制御することを特徴とするものである。また、前記制御手段は、巻き戻し再生が指示された時に、前記記憶手段に保持された再生済データを、通常再生方向とは逆方向に間欠的に読み出して再生することを特徴とするものである。また、前記記憶手段は、前記再生済データを間引いて保持することを特徴とするものである。また、前記制御手段は、巻き戻し再生が指示された時に、前記再生済データの再生速度を速くすることを特徴とするものである。また、前記再生済データの記憶保持状態を指示する指示手段を有し、前記制御手段は、前記指示手段の操作状態に応じて前記再生済データの記憶保持状態を制御することを特徴とするものである。また、前記制御手段は、前記読取手段が、前記記録媒体からデータが読み取れなくなる頻度に基いて、前記再生済データの記憶保持状態を制御することを特徴とするものである。また、前記制御手段は、前記記憶手段に記憶されている前記未再生データと再生済データのデータ量との関係に基づき、前記再生済データの記憶保持状態を制御することを特徴とするものである。また、前記制御手段は、早送り再生が指示された時には、前記未再生データのデータ量が多くなるように前記再生済データの記憶保持状態を制御することを特徴とするものである。また、前記制御手段は、前記データの再生方向に基いて、前記再生済データの記憶保持状態を制御することを特徴とするものである。また、データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、前記記憶手段から読み出したデータを記憶する再記憶手段と、特定操作に応答して前記再記憶手段に記憶された再記憶データを読み出して再生する再生手段とを備えたことを特徴とするものである。また、前記再記憶手段は、前記記憶手段から読み出したデータを間欠的に記憶する

ことを特徴とするものである。また、前記制御手段は、前記記録媒体からデータを読み取る読取速度を、再生済データの読出速度よりも早くすることを特徴とするものである。また、前記制御手段は、巻き戻し再生の終了位置が前記記憶保持手段に記憶保持されたデータ内の場合、巻き戻し再生の終了位置から記憶手段内のデータの読み出しを開始することを特徴とするものである。また、早送り再生により再生が完了したと見なされるデータは、再生済データとして処理されることを特徴とするものである。また、データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、前記制御手段は、通常再生中に早送り再生が指示された時に、前記記憶手段に記憶されているデータを通常再生方向と同方向に間欠的に読み出すことを特徴とするものである。また、データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、早送り再生が指示された時に、前記制御手段による読出速度を速くなるように変更する読出速度変更手段を備えたことを特徴とするものである。また、データの記録された記録媒体からデータを読み取る読取手段と、該読取手段により読み取られたデータを記憶する記憶手段と、該記憶手段に記憶されたデータを読み出して再生する制御手段とを有する再生装置において、早送り再生が指示された時に、前記記憶手段に記憶されているデータにより再生を行う早送り再生手段と、早送り再生中に前記読取手段のデータ読取位置を、前記読出手段が読み出し中のデータが記録された前記記録媒体上の位置まで移動させる移動手段と、前記読取手段が前記記録媒体上の読出中位置まで移動し、読取り可能となった後に、前記早送り再生手段の再生を、前記読取手段が前記記録媒体から読み取ったデータによる再生に切り換えるデータ切換手段とを備えたことを特徴とするものである。また、前記記憶手段に記憶されているデータ量を検出するデータ量検出手段と、前記データ量検出手段により検出されたデータ量が所定量以下になったことを検出した時に、前記移動手段を起動する起動手段とを備えたことを特徴とするものである。

【発明の実施の形態】図１は本発明の第１の実施の形態に係るディスク再生装置の構成を示すブロック図である。以下、図を用いて説明する。１は音声データ等が記録されたＣＤ（コンパクトディスク）、ＭＤ（ミニディスク）等のディスクである。２はレーザ光をディスク１の信号記録面に照射し、その反射光を検出してデータを読み取る光ピックアップである。２１はディスク１を所定の線速度で回転させるためのスピンドルモータである。２２はディスク１の所定位置（半径方向）に光ピックアップ２を高速で移動させるための送り機構で、モータ、送りネジ等により構成される。２３は光ピックアップ２が正常にデータが読み取れるように、光ピックアップ２からの出力信号（例えば、ＲＦアンプ３１の出力）を基に、光ピックアップ２、スピンドルモータ２１、送り機構２２をフィードバック制御する、所謂フォーカスサーボ、トラッキングサーボ、スピンドルサーボ、スライディングサーボ制御を行うためのサーボ回路である。３１は光ピックアップ２により読み取ったデータを増幅し、デジタル信号処理回路３２に出力すると共に、フィードバックをかけるためのトラッキングエラー信号やフォーカスエラー信号を生成してサーボ回路２３に出力するＲＦアンプである。３２は光ピックアップ２の読み取ったデータの復調、誤り訂正等の信号処理を行うデジタル信号処理回路で、出力信号はメモリ制御部４１を介して一旦耐震用メモリ４に記憶される。４はディスク１から読み取ったデータを一時記憶し、また記憶したデータを出力回路５に出力する耐震用メモリで、再生中に振動等によりディスク１からデータが読み取れなくなった時に、光ピックアップ２が再度データを読み取るまでの間のバッファーメモリとして使用される。４１は耐震用メモリ４への書き込み（記憶）、読み出し（再生（通常）、早送り再生、巻き戻し再生）を制御するメモリ制御部で、マイクロコンピュータや論理回路等で構成される。５は耐震用メモリ４から読み出したデータ（デジタル）をアナログデータに変換し音声出力する出力回路で、デジタルアナログ変換回路、変換されたアナログ信号を増幅する電力増幅回路や電気信号を音声信号に変換するスピーカ等により構成される。６はシステム全体を制御するシステム制御部で、マイクロコンピュータ等で構成される。また、システム制御部６はメモリ制御部４１の動作制御を行っており、またメモリ制御部４１からの信号により耐震メモリ４の状態を把握しており、その結果システム制御部６の制御により耐震メモリ４、メモリ制御部４１も含めたシステム全体の制御が行えるようになっている。７は再生、早送り再生、巻き戻し再生等の各種操作指示を行うための操作キーからなる操作部である。図２は本発明の第１の実施の形態に係るディスク再生装置の動作説明図で、（ａ）はディスク上のデータ記録位置を示す図、（ｂ）はメモリの記憶状態図、（ｃ）は早送り再生／巻き戻し再生時のデータの読み出し状態図、（ｄ）は再生済データの記憶状態図である。以下、図を用いて説明する。尚、本実施の形態は本発明の再生装置の基本動作を説明するためのものである。耐震用メモリ４を備えたディスク再生装置の再生状態では、ディスク１がディスク再生装置に装着されると、先ず、ディスク１からの読取データは図２（ｂ）に示すように耐震用メモリ４（以下、単にメモリ４と称する）の空き領域に記憶され、耐震用の蓄積データ（未再生データ）となる。一方、メモリ４の所定位置から蓄積データ

が読み出されて出力回路５に送られ音声出力となる。この場合、ディスク１からデータを読み取って、メモリ４に記憶する速度は、再生のためにメモリ４から蓄積データを読み出す速度よりも速くなるように制御されており、メモリ４内に所定量のデータが蓄積されるとディスク１からのデータの読み取りは停止される。このように蓄積データが一定になるようにディスク１からの読み取りが制御されている。従って、図２（ａ）に示すように再生中のデータ記録位置よりも光ピックアップ２の読取中のデータ記録位置の方がメモリ４に記憶されている容量分（蓄積データに相当する時間）だけ先に進んでいることになる。再生のために読み出されたデータは所定時間（所定時間に対応するデータ量）はメモリ４から消去されず、再生済データとしてメモリ４の再生済データ記憶領域に残される。蓄積データが記憶される未再生データ記憶領域と再生済データが記憶される再生済データ記憶領域の比率は以降の実施の形態において述べるごとく目的に応じて設定される。再生中に振動等によりディスク１からデータが読み取れなくなると、光ピックアップ２はトラッキングサーボ、フォーカスサーボ等を行い、その位置から再度データの読み取りを行う。この間は既にディスク１から読み取られ、メモリ４の未再生データ記憶領域に蓄積（記憶）されている蓄積データを順次、データ番号（データの並び順を概念的に示した番号）７、８、９、１０、１１・・・・のデータを再生する。この蓄積データ（未再生データ）がある間に光ピックアップ２が正常にデータの読み取りができるような状態に戻れば音飛びは発生しない。この状態で操作部７により早送り再生が指示されると、再生中の位置（図２（ｃ）のデータ番号６）から、蓄積データを予め設定された特定数間引くように間欠的に順次読み出し、再生する（本図の場合、データ番号７、９、１１・・・・のデータを再生（２倍速再生の場合）する）。また、この状態で巻き戻し再生が指示されると、再生中の位置（図２（ｃ）のデータ番号６）から再生済データを予め設定された特定数間引くように間欠的に順次逆方向に、例えば、本例の場合データ番号５、３、１・・・・のデータを順次再生（２倍速巻き戻し再生の場合）する。尚、再生（読出）が完了した巻き戻し用の再生済データは、巻き戻しが指示された時のみ検索用として使用するので、例えばデータ番号１４、１３、１２、１１、１０・・・・のデータというように、連続したデータを残す必要はなく、再生の完了したデータのうち予め設定された特定のデータ、図２（ｄ）のごとく、例えばデータを間引いて、データ番号１４、１０、６、２のデータを間欠的に残す（４倍速巻き戻し再生の場合）ことにより、メモリ４の容量を有効に使用できる。この場合、巻き戻し再生が指示されると、メモリ４の未再生データ記憶領域に記憶されているデータを、そのまま逆方向に読み出すことにより巻き戻し再生ができる。尚、早送りまたは巻き戻し再生において、メモリ４に記憶されているデータを間欠的に読み出して再生するのではなく、メモリ４に記憶されている連続したデータ（データ番号１５、１６、１７、１８、１９・・・・のデータ）の読み出し速度をｎ倍にしてｎ倍速の早送り再生を行うようにしてもよい。同様に巻き戻し再生の場合は、メモリに記憶されている連続したデータ（データ番号１４、１３、１２、１１、１０・・・・のデータ）を読み出し速度をｎ倍にしてｎ倍速の巻き戻し再生を行うようにしてもよい。また、記録媒体（ディスク１）に記録されているデータは、音声情報を再生するための音声データ（ＣＤ、ＭＤ等）または画像情報を再生するための画像データ（ＣＤ－ＲＯＭ、ＤＶＤ等）であり、記憶手段（メモリ４）からの読み出し（読み出すべきデータ番号、読み出し速度等）を制御することにより、早送り再生、巻き戻し再生、静止画像再生、巻き戻しコマ送り再生等が行える。図３は本発明の第１の実施の形態に係るディスク再生装置のシステム制御部６の行う処理を示すフローチャートで、（ａ）は常時記憶時処理、（ｂ）は早送り再生／巻き戻し再生時処理、（ｃ）はＰＬＡＹ（通常）時再生処理である。以下、図を用いて説明する。尚、本処理はディスク再生装置にディスク１がセットされた状態から開始する。先ず、ディスク１から読み取ったデータの記憶について図３（ａ）のフローチャートを用いて説明する。この処理はディスク再生装置の動作中は常時行われている。ステップＳ１１では、再生済データが所定量よりも多いか否かを判断して再生済データが所定量よりも多いとステップＳ１２に移り、再生済データが所定量よりも少ないとステップＳ１３に移る。つまり、限られたメモリ容量を有効に使用するために、ディスク１から読み取りメモリ４に記憶した未再生データと、メモリ４から読み出して再生が完了しメモリ４に残されている再生済データのデータ量のバランスを考慮するものであり、データ量はメモリ４中の記憶アドレスＹと再生アドレスＸとを比較して判断する。ステップＳ１２では、ディスクからデータを読み取り、メモリに記憶して処理を終える。つまり、再生済データが所定量よりも多く未再生データが少ない状態にあり、このような時にディスク１からデータが読み取れなくなると、光ピックアップ２を所定位置まで移動して、再調整が完了するまでの間、少ないメモリ４中の未再生データでは対処できず、音飛び（メモリ４からの読出データとディスクからの読取データが連続しない）が発生する恐れがある。また、早送り再生が指示された時にも、メモリ４中の未再生データのデータ量が少ないと、同様の理由により音途切れ（データの連続性よりも早送り再生の中断）が発生する恐れがある。そこで、メモリ４中の未再生データのデータ量を多くするように、ディスク１からデータを読み取りメモリ４に記憶する。メモリ４に新規データが記憶されると、再生済データはオーバーフローされ、その結果、再生済データの

データ量は減少する。尚、早送り再生が指示された時にも未再生データのデータ量が減少しないように、ディスク１からのデータの読取速度はメモリ４からの読出速度（早送り再生速度）よりも速くする必要がある。ステップＳ１３では、ディスクからデータの読み取りとメモリへの記憶を停止して処理を終える。つまり、再生済データが所定量よりも少なく未再生データが多い状態にあり、このような時に巻き戻し再生が指示されると、光ピックアップ２を所定位置まで移動して、再調整が完了するまでの間、少ないメモリ４中の再生済データでは対処できず、音途切れが発生する恐れがある。そこで、新規データの記憶による再生済データのオーバーフローを防ぎ、メモリ４中の再生済データのデータ量を多くするように、ディスク１からのデータの読み取りとメモリ４への記憶を停止する。次に、早送り再生、巻き戻し再生時の処理について図３（ｂ）のフローチャートを用いて説明する。この処理は操作部７により早送り再生／巻き戻し再生が指示された時に割り込みで行われる。ステップＳ２１では、早送り再生が指示されたか否かを判断して早送り再生が指示されるとステップＳ２２に移り、巻き戻し再生が指示されるとステップＳ２３に移る。つまり、ユーザの操作した操作部７の状態から早送り再生または巻き戻し再生のいずれが指示されたかを判断する。ステップＳ２２では、未再生データが所定量よりも多いか否かを判断して未再生データが所定量よりも多いとステップＳ２５に移り、未再生データが所定量よりも少ないとステップＳ２３に移る。つまり、早送り再生ではメモリ４中の未再生データを使用するので、このデータ量が所定量以上なければ、光ピックアップ２を所定位置まで移動して、調整が完了するまでの間、少ないメモリ４中の未再生データでは対処できず、音途切れが発生する恐れがある。この所定量は光ピックアップ２を所定位置まで移動して、調整が完了するまでの時間に対応して決められる。データ量はメモリ４中の記憶アドレスＹと再生アドレスＸとを比較して判断する。ステップＳ２３では、光ピックアップの移動が完了したか否かを判断して光ピックアップの移動が完了すればステップＳ３０に移り、光ピックアップの移動が完了しなければステップＳ２４に移る。つまり、早送り／巻き戻し再生データに対応する（連続する）位置まで光ピックアップ２が移動できたか否かを判断するもので、光ピックアップ２の位置は読み取ったデータのデータ番号（アドレス）から判断できる。ステップＳ２４では、光ピックアップを移動してステップＳ２４に移る。つまり、メモリ４に記憶されているデータを使用して早送り／巻き戻し再生を開始すると同時に、光ピックアップ２を所定位置まで移動させる。例えば、早送り／巻き戻し再生データに対応する（連続する）位置まで光ピックアップ２をトラックジャンプ等により高速で移動させる。ステップＳ２５では、アドレスＸのデータを出力してステップＳ２６に移る。つまり、メモリ４に記憶されているアドレスＸのデータを読み出して再生する。ステップＳ２６では、早送り再生／巻き戻し再生のいずれが指示されたかを判断して早送り再生が指示されるとステップＳ２７に移り、巻き戻し再生が指示されるとステップＳ２９に移る。つまり、ユーザの操作した操作部７の状態から早送り再生または巻き戻し再生のいずれが指示されたかを判断する。ステップＳ２７では、アドレスＸ＋２のデータを読み出して再生する。つまり、早送り再生であるのでアドレス（データ番号）が増加する方向に、未再生データの予め設定された特定（２倍再生の場合は、例えば奇数番目）のデータのみを間欠的に順次再生する（図２（ｃ）参照）。ステップＳ２８では、オーバーフロー処理して処理を終える。つまり、再生方向のデータが増加するように、ディスク１からデータを読み取り、メモリ４に記憶するにともない、再生済データは順次メモリ４からオーバーフローして減少する。ステップＳ２９では、アドレスＸ－２のデータを読み出して再生する。つまり、巻き戻し再生であるのでアドレス（データ番号）が減少する方向に、再生済データの予め設定された特定（２倍再生の場合は、例えば奇数番目）のデータのみを間欠的に順次逆方向に再生する（図２（ｃ）参照）。尚、特定のアドレスの再生済データのみが間欠的にメモリ４に記憶されている場合には、記憶されているデータを順次逆方向に再生する（図２（ｄ）参照）。ステップＳ３０では、読取データを出力（間引き出力）してステップＳ３１に移る。つまり、ディスク１からのデータが読み取れるように光ピックアップ２の移動、調整が完了したので、メモリ４に記憶されているデータ（再生方向により未再生データ、再生済データが決まる）から、ディスク１から読み取ったデータに切り換える。ディスク１から読み取ったデータは連続したアドレスのデータであり、２倍速早送り再生する場合には奇数番目（データ番号）のデータのみを出力回路５に出力する（間引き出力）。ステップＳ３１では、読取データをメモリに記憶して処理を終える。つまり、ディスク１から読み取ったデータを未再生データとしてメモリ４に記憶する。この場合は、再生に必要な未再生データであるので、連続したアドレスの全データを記憶する。続いて、ＰＬＡＹ時再生処理について図３（ｃ）のフローチャートを用いて説明する。この処理は操作部７により再生（通常再生）が指示された時に割り込みで行われる。ステップＳ４１では、アドレスＸのデータを読み出して出力回路に出力してステップＳ４２に移る。つまり、メモリ４に記憶されているアドレスＸのデータを出力回路５に出力する。ステップＳ４２では、アドレスＸ＋１のデータを読み出して出力回路に出力する。つまり、再生であるのでアドレス（データ番号）が増加する方向に、未再生データを順次再生する。ステップＳ４３では、オーバーフロー処理して処理を終える。つまり、再生方向のデータが増加するように、デ

ィスク１からデータを読み取り、メモリ４に記憶するにともない、再生済データは順次メモリ４からオーバーフローして減少する。以上のように本実施の形態によれば、再生中に早送り／巻き戻し再生が指示された時には、先ず、メモリに記憶されているデータを使用して、再生中の位置から早送り／巻き戻し再生を開始するので待ち時間がなくなる。また、メモリによる早送り／巻き戻し再生中に、光ピックアップを所定位置まで移動させデータの読み取りが可能な状態になると、メモリからの読出データから光ピックアップによる読取データに切り換えるので、メモリの容量に制限されることなく長時間の早送り／巻き戻し再生が可能になる。図４は本発明の第２の実施の形態に係るディスク再生装置の動作説明図で、（ａ）はシステム制御部６の行う処理を示すフローチャート、（ｂ）は全未再生領域時のメモリの記憶状態図、（ｃ）は未再生領域拡大時のメモリの記憶状態図である。（ｄ）は通常時のメモリの記憶状態図である。以下、図を用いて説明する。尚、本処理はディスク再生装置にディスクがセットされた状態から開始する。また、本実施の形態は、メモリ内における未再生データと再生済データの記憶比率を適正にするものである。ステップＳ５１では、領域変更が操作されたか否かを判断して領域変更が操作されるとステップＳ５２に移り、領域変更が操作されなければステップＳ５３に移る。つまり、ユーザの操作した操作部７の状態から判断する。車載用のディスク再生装置においては、振動により音飛びが発生する恐れが多いので、ユーザがマニュアルで未再生データ領域が多くなるように設定される。また、巻き戻し再生を頻繁に使用するユーザでは再生済データ領域が多くなるように再生済データ領域が多くなるように設定される。ステップＳ５２では、操作された方向に領域更新して処理を終える。ステップＳ５３では、早送り再生が指示されたか否かを判断して早送り再生が指示されるとステップＳ５４に移り、巻き戻し再生（または通常再生）が指示されるとステップＳ５５に移る。つまり、ユーザの操作した操作部７の状態から早送り再生または巻き戻し再生のいずれが指示されたかを判断する。ステップＳ５４では、未再生データ領域を拡大して処理を終える。つまり、早送り再生ではメモリ４中の未再生データを使用するので、このデータ量が多くなければ、光ピックアップ２を所定位置まで移動して、調整が完了するまでの間、少ないメモリ４中の未再生データでは対処できず、音途切れが発生する恐れがある。そのために、未再生データ領域を拡大する。ステップＳ５５では、早送り再生による未再生データ領域の拡大を解除してステップＳ５６に移る。つまり、巻き戻し再生時には、多くの未再生データは必要なく、巻き戻し再生が指示された時に対応できるように再生済データのデータ量を増やすために、早送り再生時に拡大した未再生データ領域拡大処理を解除する（当初のデータ量に戻す）。ステップＳ５６では、読み取りエラーの発生頻度を判断して、エラーの発生頻度が大きければステップＳ５７に移り、エラーの発生頻度が中程度であればステップＳ５８に移り、エラーの発生頻度が小さければ処理を終える。つまり、再生中に読み取りエラーが発生すると、その都度、光ピックアップ２を所定位置まで移動し、調整する必要がある。この間はメモリ４に記憶されているデータを使用して再生が途切れないようにするために必要な未再生データのデータ量を判断するためである。ステップＳ５７では、全領域を未再生データ領域として処理を終える。つまり、読み取りエラーの発生頻度が大きく、頻繁に光ピックアップ２の移動、調整を行う必要がある。その間は新たなデータの読取、記憶ができず、未再生データが減少し続ける。そのために、常に未再生データが最大になるようにメモリ４の全領域を未再生データ領域とする（図４（ｂ）参照）。尚、その結果として、巻き戻し再生時に必要な再生済データは記憶できなくなり、巻き戻し再生が開始できるまで多少時間を要するが、再生時に音飛びが発生する方が重大な障害であるので、音飛び対策を重点に未再生データを増やす。ステップＳ５８では、再生済データ領域を減少させて処理を終える。つまり、読み取りエラーの発生頻度が中程度であるので、未再生データと再生済データのデータ量のバランスを考慮して再生済データ領域を減少させ、巻き戻し再生用に再生済データも記憶できるようにする（図４（ｃ）参照）。以上のように本実施の形態によれば、読み取りエラーの発生頻度に応じてメモリの未再生データ領域と再生済データ領域の比率を変更するのでメモリの容量が有効に利用できる。図５は本発明の第３の実施の形態に係るディスク再生装置の動作説明図で、（ａ）はシステム制御部６の行う処理を示すフローチャート、（ｂ）は巻き戻し再生から通常再生に切り換えた時のメモリの記憶状態図である。以下、図を用いて説明する。ステップＳ６１では、巻き戻し再生が指示された時に、メモリ４内のデータ（再生済データ）だけで巻き戻し再生が完了したか否かを判断して、メモリ４内のデータ（再生済データ）だけで巻き戻し再生が完了すればステップＳ６２に移り、メモリ４内のデータ（再生済データ）だけで巻き戻し再生が完了しなければステップＳ６３に移る。つまり、巻き戻し再生が指示された後、図５（ｂ）のごとく、メモリ４に記憶されたデータ内で巻き戻し再生が終了し、通常再生に切り換えられたか否かを判断する。ステップＳ６２では、データの読出位置はそのまま、データの読取位置は未再生データの続きとして処理を終える。つまり、メモリ４に記憶された再生済データ内で巻き戻し再生が終了し、通常再生に切り換えるので、巻き戻し再生用に光ピックアップ２を移動、調整してディスク１から新たにデータを読み取る必要はない。そこで、読取位置（光ピックアップ位置）は変更せず（巻き戻し再生が指示される直前の位置）、再生に切り換わった時点から既に読

み取られている未再生データの続きからデータの読み取りを行う。また、メモリ４からのデータの読出位置は、データが全てメモリ４にあるので指示された方向に読み出して再生する。ステップＳ６３では、データの読出位置は新規読取位置、データの読取位置は巻き戻し再生にともなう読取終了位置として処理を終える。つまり、メモリ４に記憶された再生済データ内で巻き戻し再生が終了せず、巻き戻し再生用に光ピックアップ２を移動、調整してディスク１から新たにデータを読み取ることになる。そこで、再生に切り換わった時点の読取位置（光ピックアップ位置）から再生方向にデータの読み取りを始める。また、メモリ４からのデータの読出位置は、巻き戻し再生が終了した位置（新規読取位置）から通常通りデータを読み出して再生する。以上のように本実施の形態によれば、メモリ内に記憶されているデータだけで巻き戻し再生から通常再生に切り換える場合には光ピックアップの移動がともなわないので、各再生処理間の切り換えのための待ち時間をなくすことができる。図６は本発明の第４の実施の形態に係るディスク再生装置の動作説明図で、（ａ）はメモリの構成図、（ｂ）はシステム制御部６の行う処理を示すフローチャートである。以下、図を用いて説明する。本実施の形態は、未再生データを記憶するメモリと再生済データを記憶するメモリを別にして再生制御を容易にしたものである。４ａはディスク１から読み取った未再生データを記憶する第１メモリである。４ｂは第１のメモリ４ａから読み出し、再生した再生済データを記憶する第２のメモリ（再記憶手段）である。ステップＳ７１では、アドレスＸのデータを出力してステップＳ７２に移る。つまり、ディスク１から読み取って第１メモリ４ａに記憶されている未再生データの所定のアドレスＸのデータを読み出して再生する。ステップＳ７２では、第１メモリ４ａから読み出したデータのアドレスＸが偶数であるか否かを判断してアドレスＸが偶数であればステップＳ７３に移り、アドレスＸが偶数でなければ（奇数）処理を終える。つまり、通常再生では、全アドレスのデータを使用するが、巻き戻し用に第２メモリ４ｂに記憶するデータは間欠的なデータでよいので、アドレスが偶数番目のデータ（再生済データ）のみを選択する。ステップＳ７３では、アドレスが偶数番目のデータを第２メモリ４ｂに記憶して処理を終える。つまり、巻き戻し用に第２メモリ４ｂに記憶する。尚、巻き戻し再生が指示されると、第２メモリ４ｂから逆方向に順次再生する。尚、第１メモリ４ａと第２メモリ４ｂはハード的に別のメモリである必要はなく、１つのメモリの記憶領域を予め第１領域（第１メモリ４ａ）と第２領域（第２メモリ４ｂ）に区分して使用してもよい。以上のように本実施の形態によれば、ディスクから読み取った未再生データを第１メモリに記憶し、再生済データを第２メモリに区別して記憶することにより、早送り再生や巻き戻し再生時に使用するメモリが別になるので、メモリへの書き込み、読み出し制御、例えば書き込み、読み出し位置を指定するメモリアドレスの指定方法等が容易になる。尚、各実施の形態の説明に用いた語の「巻き戻し再生」は、本来テープを巻く動作のあるテーププレーヤにおいて用いられるべきものであるが、一般的に逆方向再生の意味でディスクプレーヤ等においても用いられるので、本明細書でもその意味で用いている。また、巻き戻し再生には、再生と同速度で再生する方法と、早送り再生のように高速で再生する方法があり、本実施の形態においても両方の方法に対応可能である。

【発明の効果】以上説明したように、本発明では、早送り再生や巻き戻し再生時に、音途切れや待ち時間の発生を抑えた再生装置が提供できる。

【図面の簡単な説明】

【図１】本発明の第１の実施の形態に係るディスク再生装置の構成を示すブロック図である。

【図２】本発明の第１の実施の形態に係るディスク再生装置の動作説明図である。

【図３】本発明の第１の実施の形態に係るディスク再生装置のシステム制御部６の行う処理を示すフローチャートである。

【図４】本発明の第２の実施の形態に係るディスク再生装置の動作説明図である。

【図５】本発明の第３の実施の形態に係るディスク再生装置の動作説明図である。

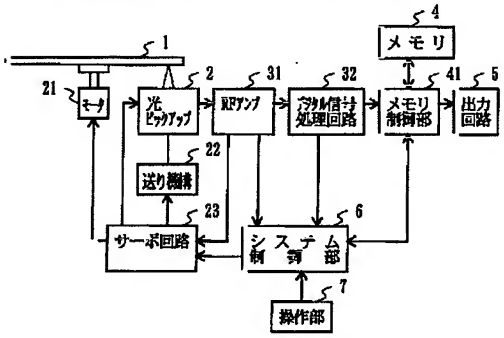
【図６】本発明の第４の実施の形態に係るディスク再生装置の動作説明図である。

【符号の説明】

１・・・・ディスク、　　３２・・・デジタル信号処理回路、２・・・・光ピックアップ、　４・・・・耐震用メモリ、２１・・・スピンドルモータ、　４１・・・メモリ制御部、２２・・・送り機構、
５・・・・出力回路、２３・・・サーボ回路、
６・・・・システム制御部、３１・・・ＲＦアンプ、
７・・・・操作部。

【図1】

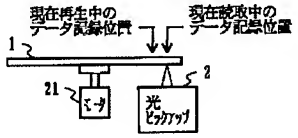
本発明の第1の実施の形態に係るディスク再生装置の構成を示すブロック図



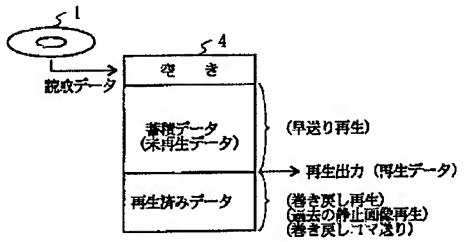
【図2】

本発明の第1の実施の形態に係るディスク再生装置の動作説明図

(a) ディスク上のデータ記録位置を示す図



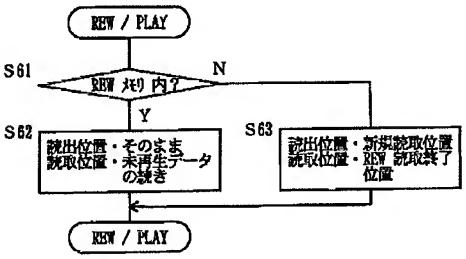
(b) メモリの記憶状態図



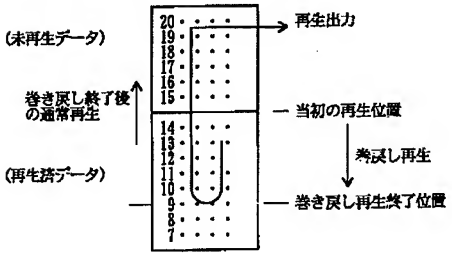
【図5】

本発明の第3の実施の形態に係るディスク再生装置の動作説明図

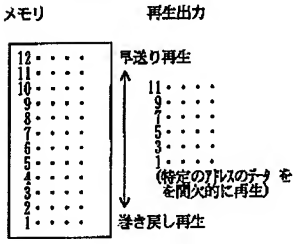
(a) システム制御部6の行う処理を示すフローチャート



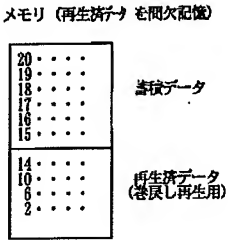
(b) 巻き戻し再生→通常再生時のメモリの記憶状態図



(c) 早送り再生/巻戻し再生時のデータの読み出し状態図



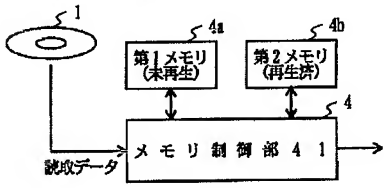
(d) 再生済データの記憶状態図



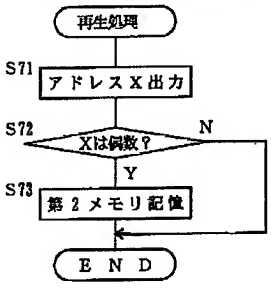
【図6】

本発明の第4の実施の形態に係るディスク再生装置の動作説明図

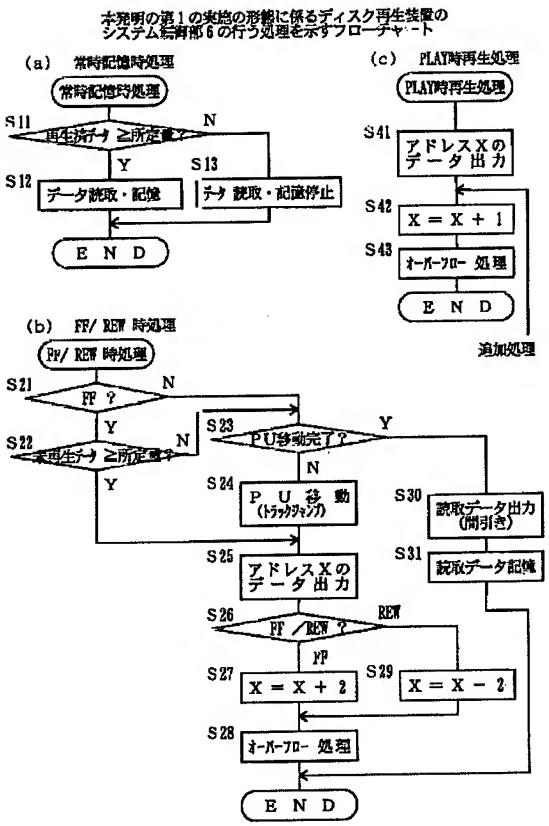
(a) メモリの構成図



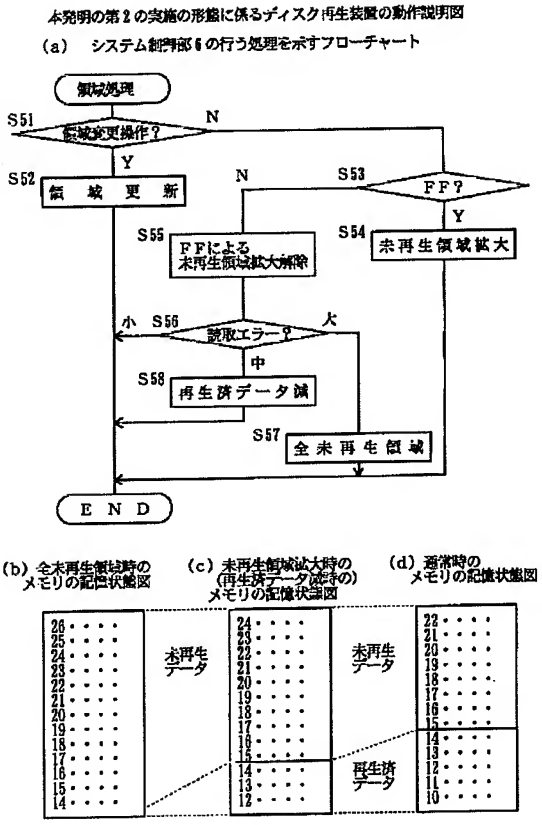
(b) システム制御部6の行う処理を示すフローチャート



【図3】


本発明の第1の実施の形態に係るディスク再生装置のシステム制御部6の行う処理を示すフローチャート
(a) 常時記憶時処理
常時記憶時処理
S11
再生済データ≧所定量?
N
Y
S12
データ読取・記憶
S13
データ読取・記憶停止
END
(c) PLAY時再生処理
PLAY時再生処理
S41
アドレスXのデータ出力
S42
X=X+1
S43
オーバーフロー処理
END
追加処理
(b) FF/REW時処理
FF/REW時処理
S21
FF?
N
Y
S22
未再生データ≧所定量?
N
Y
S23
PU移動完了?
Y
N
S24
PU移動(トラックジャンプ)
S25
アドレスXのデータ出力
S26
FF/REW?
REW
FF
S27
X=X+2
S29
X=X-2
S28
オーバーフロー処理
END
S30
読取データ出力(間引き)
S31
読取データ記憶

【図4】


本発明の第2の実施の形態に係るディスク再生装置の動作説明図
(a) システム制御部6の行う処理を示すフローチャート
領域処理
S51
領域変更操作?
N
Y
S52
領域更新
N
S53
FF?
Y
S55
FFによる未再生領域拡大解除
S54
未再生領域拡大
小 S56
読取エラー?
大
中
S58
再生済データ減
S57
全未再生領域
END
(b) 全未再生領域時のメモリの記憶状態図
(c) 未再生領域拡大時の(再生済データ減算時の)メモリの記憶状態図
(d) 通常時のメモリの記憶状態図
未再生データ
再生済データ
未再生データ
再生済データ